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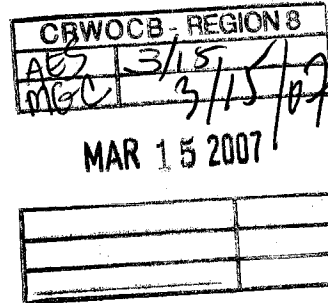
**Two-Phase and Soil Vapor
Extraction Pilot Test Studies
Report**

**Former Y-12 Facility
Anaheim, California**

March 2007



Mr. Maneck G. Chichgar
California Regional Water Quality Control Board
Santa Ana Region
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Subject:
Two-Phase and Soil Vapor Extraction Pilot Test Studies Report
Former Y-12 Facility
301 Orangethorpe Avenue
Anaheim, California
CAO No. R8-2003-108

ARCADIS BBLES

Date:
March 13, 2007

Dear Mr. Chichgar:

Contact:
Steven A. Fry

BBL Environmental Services, Inc. (BBLES, now known as ARCADIS U.S., Inc. [ARCADIS BBLES]) is pleased to provide you with one copy of the Two-Phase and Soil Vapor Extraction Pilot Test Studies Report, dated March 8, 2007, for the Northrop Grumman Systems Corporation (NGSC) Former Y-12 Facility in Anaheim, California. This report was prepared on behalf of NGSC to present the findings of the pilot test conducted in accordance with the October 12, 2004 Groundwater Remediation Plan prepared by URS Corporation. A second copy is also being sent directly to Mr. Robert Holub of the Regional Water Quality Control Board.

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Our ref:
B0037134.0000.00005

Please contact the undersigned or Mr. Michael Martin at 301.331.1766 if you have any questions regarding this report or other aspects of the project.

Sincerely,

ARCADIS U.S., Inc.

Steven A. Fry, P.G.
Senior Geologist II

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OCVOCRWQCB004107

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Transmittal Letter

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Copies:
Mr. Maneck Chichgar
Ms. Malissa McKeith
Mr. Michael Martin

From:
Steven A. Fry, P.G.

Date:
March 14, 2007

Subject:
TPE and SVE Pilot Test Studies Report
Former Y-12 Facility

ARCADIS BBL Project No.:
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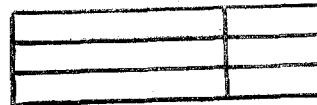
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March 13, 2007

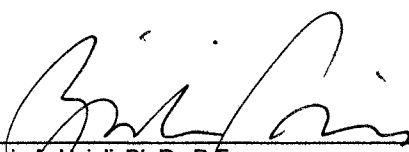
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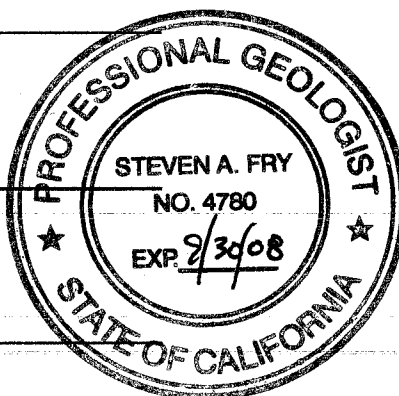
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**Two-Phase and Soil Vapor
Extraction Pilot Test Studies
Report**

Former Y-12 Facility
Anaheim, California

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March 8, 2007

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Executive Summary

BBL Environmental Services, Inc., an ARCADIS company (BBLES), has prepared this Two-Phase Extraction (TPE) and Soil Vapor Extraction (SVE) Pilot Test Report for Northrop Grumman Systems Corporation (NGSC) to provide a summary of the TPE and SVE pilot testing conducted at the Former NGSC Y-12 Facility (Site) in Anaheim, California. The TPE/SVE pilot tests were performed between October 23 and 26, 2006 in general accordance with the Groundwater Remediation Plan, prepared by URS Corporation on October 12, 2004 and approved by the Santa Ana Regional Water Quality Control Board in their April 19, 2006 letter. This work was conducted based on our proposal to NGSC dated July 18, 2006.

The facility was operated by NGSC for aerospace manufacturing between 1962 and 1994 for manufacturing aircraft parts. The Site was sold in 1996 and is now used as an automotive products packaging and storage facility. Before selling the property, NGSC conducted soil investigation and performed limited soil remediation of petroleum compounds, metals, and volatile organic compounds (VOCs). In 1995, the SARWQCB issued a "no further action" letter for the soil remediation performed at specific locations at the former Site. Following this determination, NGSC installed a network of 18 groundwater monitoring wells to evaluate the quality of the groundwater beneath and in the vicinity of the facility. Based on these results, the SARWQCB concluded that no further investigations downgradient of the Y-12 facility were necessary and requested that NGSC develop a groundwater remediation plan to address onsite impacts. Based on previous investigations, the primary constituents of concern (COCs) in groundwater at the site are VOCs, including trichloroethene (TCE), 1,1,1-trichloroethane (1,1,1-TCA), 1,1-dichloroethene (1,1-DCE), and tetrachloroethene (PCE). However, PCE is not known to have been used at the site and is not considered to be a site-related COC.

The purpose of the TPE/SVE pilot test was to evaluate the performance and effectiveness of these remedial technologies in reducing the concentrations of the volatile organic COCs in vadose-zone soil and perched groundwater at the site. A second objective was to gather data related to subsurface conditions to develop site-specific engineering design parameters to aid in selecting a remediation technology.

Prior to the commencement of the TPE/SVE pilot testing, three nested monitoring/SVE wells (NMW-11, NMW-12, and NMW-13) were installed at distances of approximately 12, 30, and 60 feet from monitoring well NMW-2A, which was used as the TPE/SVE extraction well. Each of the three nested monitoring/SVE wells consisted of a dual

completion, with a shallow interval screened between 30 and 70 feet bgs and a deeper interval screened between 80 and 95 feet bgs. The shallow interval was used to test conditions in the vadose zone and the deeper interval was used to evaluate the perched groundwater interval. The shallow screened interval of well NMW-11 was later utilized for vapor extraction as part of the SVE pilot test.

TPE pilot testing was initiated on October 23, 2006 with system installation and debugging prior to two days of system operation. This was followed by one day of SVE pilot testing on October 26, 2006. The TPE technology removed a combination of contaminated groundwater and hydrocarbon-impacted vapors from the subsurface in a high-velocity dual-phase stream, while the SVE system extracted only vapor streams. Both systems were operated at various flow and vacuum settings to determine which parameters work best for the lithologic conditions. The effect of each remedial system on monitoring wells located in the vicinity of the extraction well was evaluated throughout the pilot test period.

The efficiency and implementability of the investigated remedial technologies were assessed based on two criteria: radius of influence (ROI) and the removal rate of volatile organic compounds (VOCs). High removal rates were observed over the limited period of time during the initial testing of the SVE system. The ROI of the SVE pilot system, determined by monitoring the vacuum in the groundwater monitoring wells surrounding the extraction well, was estimated to be approximately 50 feet. In the TPE technology case, the VOC removal rate (as hexane) was significantly lower depending on the operating conditions. The low permeability of the soil and the lack of hydraulic conductivity were manifested in the absence of communication between the extraction well and the monitoring wells. Neither groundwater drawdown nor vacuum was detected in the monitoring wells.

Therefore, the higher initial VOC removal efficiency and the more significant radius of influence associated with the SVE system indicated the superiority of SVE over TPE for potential full-scale implementation at the Site. The SVE pilot test also generated essential data that would be used to develop site-specific engineering design parameters for full-scale application of SVE at the Site.

1. Introduction

BBL Environmental Services, Inc., an ARCADIS company (BBLES), has prepared this Two-Phase Extraction (TPE) and Soil Vapor Extraction (SVE) Pilot Test Report for Northrop Grumman Systems Corporation (NGSC) to provide a summary of the TPE and SVE pilot testing conducted at the Former NGSC Y-12 Facility (Site) in Anaheim, California. The TPE/SVE pilot tests were conducted in general accordance with the Groundwater Remediation Plan (GRP), prepared by URS Corporation on October 12, 2004 (URS, 2004) and approved by the Santa Ana Regional Water Quality Control Board (SARWQCB) in their April 19, 2006 letter. This work was conducted based on our proposal to NGSC dated July 18, 2006.

The pilot test was conducted in the western portion of the facility, which is located at 301 E. Orangethorpe Avenue in Anaheim, California (Figure 1). The facility is now operated by EMPI, Inc. (EMPI), an automotive parts and accessories wholesaler. This summary report covers the pre-field activities, system installation, operation, monitoring activities, and results for both pilot tests.

1.1 Site Description

The Site is bordered to the north by Kimberly Avenue and to the south by Orangethorpe Avenue. A trailer park and commercial/light industrial properties border the Site to the east and west, respectively. The former Y-12 facility was operated by NGSC between 1962 and 1994 for manufacturing aircraft parts. The Site was sold in 1996 and is now used as an automotive products packaging and storage facility.

Before selling the property, NGSC conducted soil investigation and performed limited soil remediation of petroleum compounds, metals, and volatile organic compounds (VOCs). In 1995, the SARWQCB issued a "no further action" letter for the soil remediation performed at specific locations at the former Y-12 facility. Following this determination, NGSC installed 18 groundwater monitoring wells to evaluate the quality of the groundwater beneath and in the vicinity of the facility. Based on these results, the SARWQCB concluded that no further investigations downgradient of the Y-12 facility were necessary and requested that NGSC develop a groundwater remediation plan to address onsite impacts. Based on previous investigations, the primary constituents of concern (COCs) in groundwater at the site are VOCs, including trichloroethene (TCE), 1,1,1-trichloroethane (1,1,1-TCA), 1,1-dichloroethene (1,1-DCE), and tetrachloroethene (PCE). However, PCE is not known to have been used at the site and is not considered to be a site-related COC.

1.2 Site Geology and Hydrogeology

Subsurface geology studies have shown the sediments above approximately 70 feet below ground surface (bgs) to be predominantly comprised of poorly-graded sand interbedded with thin beds of silts, silty sand, and clayey sands. The sandy soil is followed by an interbedded transition zone of silts, clays, and fine sands that is underlain by a 15- to 30-foot thick clay horizon that creates localized, semi-perched groundwater conditions. The sediments below the clay interval are characterized by poorly-graded saturated sands to a depth of approximately 200 feet bgs (OCWD, 1991; URS, 2004).

The Y-12 site is located within the Santa Ana Forebay Groundwater Subbasin as identified by the Orange County Water District (OCWD, 1991). The uppermost regional aquifer beneath the Site is the Upper aquifer encountered at depths between 110 and 130 feet bgs. The first occurrence of groundwater beneath the Site is in poorly-graded sands at approximately 100 feet bgs above the Upper aquifer in localized, small, discontinuous, semi-perched groundwater zones. Regional groundwater flow in the vicinity of the Site is generally to the west-southwest at a 0.001 feet per foot gradient. A number of groundwater monitoring wells, several of which have been observed to be dry during quarterly monitoring, were installed at the Site to monitor conditions in the semi-perched zone.

1.3 Description of the Remedial Technologies

Descriptions of the TPE and the SVE technologies are presented in the following subsections.

1.3.1 TPE Pilot Test

TPE remedial systems have demonstrated their effectiveness at removing separate-phase product from the subsurface, resulting in reduction of hydrocarbons from soil and groundwater. The TPE technology uses a single vacuum pump to remove a combination of contaminated groundwater, free phase hydrocarbons, and hydrocarbon vapor from the subsurface in a high-velocity dual-phase (liquid and vapor) stream. Both liquid and vapor phases are extracted and treated or collected for disposal. Contaminated liquid and vapor are extracted through downhole piping by application of a vacuum to the well. This vacuum creates vapor phase pressure gradients and resultant vapor and liquid flow towards the well. The greater the applied vacuum, the larger the hydraulic gradients that will be achieved, resulting in greater liquid and vapor

recovery. TPE also maximizes the effectiveness of soil vapor extraction by lowering the water table and therefore increasing air-phase permeability in the dewatered part of the aquifer.

1.3.2 SVE Pilot Test

SVE, also known as soil venting and vacuum extraction, is a widely applied, effective *in situ* remedial technology used for remediating unsaturated (vadose) zone soils contaminated with volatile and semi-volatile organic compounds. The process involves inducing airflow in the subsurface via applied vacuum, thus enhancing the *in situ* volatilization of the COCs. The vacuum, usually applied to the contaminated soil matrix through extraction wells, creates a negative pressure gradient that causes movement of vapors toward these wells. SVE takes advantage of the volatility of the contaminants to allow mass transfer from adsorbed, dissolved, and free phases in the soil to the vapor phase, which is then removed under vacuum and treated above ground. The increased air flow in the subsurface can also stimulate biodegradation of the less volatile contaminants. Soil vapor extraction has several advantages that allow its implementation at a broad spectrum of sites. Soil vapor extraction:

- Can be implemented with minimal disturbance to site operations;
- Is effective in removing the volatile contaminants present in the vadose zone;
- Has the potential for treating large volumes of soil at feasible capital and operational costs;
- System can be mobilized and installed quickly and easily; and
- Is compatible and can be easily integrated with other technologies required for site cleanup.

1.4 Objectives and Scope

The purpose of the TPE/SVE pilot test was to evaluate the performance and effectiveness of these two remedial technologies in reducing the concentrations of the volatile organic COCs in vadose-zone soil and perched groundwater at the site. A second objective was to gather data related to subsurface conditions to develop site-specific engineering design parameters to aid in selecting an effective remediation technology.

The scope of pilot testing at the former Y-12 facility included the installation of three nested monitoring/SVE wells placed at distances of approximately 12, 30, and 60 feet from the TPE/SVE pilot test extraction well (NMW-2A, screened between 85 and 95 feet bgs) in order to monitor the radius of influence (ROI). Each of the three nested monitoring/SVE wells consisted of a dual completion, with a shallow interval screened between 30 and 70 feet bgs and a deeper interval screened between 80 and 95 feet bgs. The shallow interval was used to test conditions in the vadose zone and the deeper interval was used to test the perched groundwater interval. After the wells were constructed, the pilot system was installed and testing was initiated. The effect of the remedial system on the nested monitoring/SVE wells was evaluated throughout the pilot test period.

1.5 Report Organization

Section 2 discusses the work plan and methodology pertaining to pre-field activities and groundwater monitoring well installation conducted prior to pilot testing. The application of the TPE and SVE technologies and the results of the pilot testing are presented in Section 3. The effectiveness and feasibility of implementing each of the aforementioned technologies in full-scale at the Site are evaluated in Section 4. Conclusions of TPE/SVE pilot testing and recommendations for future implementation are presented in Section 5 and References are presented in Section 6.

2. Pilot Test Work Plan

2.1 Extraction and Monitoring Well Installation

In preparation for the pilot test, the three nested monitoring/SVE wells designated NMW-11, 12, and 13 were installed in the vicinity of the existing TPE extraction well (NMW-2A). These three wells were located 2.3 feet, 30.2 feet, and 60.3 feet from NMW-2A in accordance with the approved work plan prepared by URS (Figure 2). Each of the nested monitoring well boreholes was advanced to a depth of approximately 95 feet bgs. Within each borehole, two 2-inch diameter piezometers were installed. Each piezometer was constructed with Schedule 40 polyvinyl chloride (PVC) well casing and PVC screen with 0.010-inch slots. The shallow piezometer was screened from approximately 30 to 70 feet bgs, targeting the more permeable soil in the vadose zone. The second piezometer was screened from approximately 80 to 95 feet bgs, targeting the possible semi-perched groundwater. The lower screened interval in these wells was used for measurement of groundwater levels and vacuum to determine the ROI of TPE pilot system in the clayey confining layer. An "S" was appended to the well name to indicate the shallow completion (e.g., "NMW-11S") and a "D" was appended to indicate the deeper completion (e.g., NMW-11D).

The upper screened interval of NMW-11 was utilized for SVE pilot testing, while vacuum was measured in the upper screened intervals of NMW-12 and NMW-13 to estimate the ROI of the SVE technology. During drilling activities, soil samples at five foot-intervals were screened with a portable photoionization device (PID) and the soil characteristics were described. Boring logs were prepared for each well to summarize the subsurface conditions encountered (Appendix A).

The nested monitoring wells were completed at the surface with 12-inch diameter circular, flush-mounted, traffic-rated well boxes. Each well was developed by BBLES personnel a minimum of 48 hours following installation using a combination of surging, bailing, and pumping. Soil cuttings and fluids were placed in NGSC-provided containers and disposed of by NGSC. The wells were surveyed by a licensed land surveyor following development.

2.2 Pre-Field Activities

The following sections describe the activities performed in preparation for TPE/SVE pilot testing.

2.2.1 Health and Safety Plan Preparation

BBLES prepared a site-specific health and safety plan (HASP) to address health and safety concerns related to the proposed scope of the field activities.

2.2.2 Utility Clearance

BBLES conducted a site visit to locate and mark the proposed wells in coordination with NGSC and the current facility tenant/owner. During this visit, geophysical utility clearance was conducted to locate underground utilities in the vicinity of the proposed boring locations using electromagnetic (EM) pipe and cable location scans, EM induction metal detection, and ground penetrating radar. Underground Service Alert (USA) was also notified regarding planned subsurface activities.

2.2.3 Land Surveying

Following their installation, the locations of the three nested groundwater monitoring/SVE wells were surveyed by a licensed land surveyor providing northing, easting, and elevation data.

2.2.4 Permitting

Prior to the installation of the three monitoring/SVE wells, BBLES obtained well permits (Appendix B) from the City of Anaheim Public Utilities Department, Environmental Services Division and coordinated site access with the current property owner. BBLES also procured Air Quality Management District (AQMD) permits for the TPE/SVE system (Appendix C).

3. Pilot Testing Implementation

The TPE/SVE pilot test implementation methodology, results, and conclusions are discussed in the following subsections.

3.1 TPE Pilot Test

After the nested monitoring/SVE wells were installed, the TPE pilot system components were mobilized to the Site.

3.1.1 Remediation System Installation and Debugging

The TPE pilot system components were installed on October 23, 2006. The equipment included both in-well and aboveground components. The in-well components were comprised of a 1-inch, Schedule 40 PVC extraction pipe extending 1 to 2 feet above the bottom of NMW-2A. A pressure gauge was installed at the well cap to monitor vacuum in the well casing during the operation of the remedial system. The aboveground components included a TPE system consisting of a 250 standard cubic feet per minute (scfm) Dekker Hi-Vac SVE Blower permitted for chlorinated vapor/aqueous streams and equipped with a 20 horsepower (HP) motor, air-to-air cooler, air/water separator, and high level shutoff; a carbon adsorption system consisting of two 1,000-pound (lb) carbon vessels filled with virgin coconut shell carbon (1,000 lbs per vessel); a 4000-gallon Baker Tank TM for temporary water storage; and associated piping and electrical components. The aboveground components were connected to the well head through a network of flexible hosing, air pressure tubing, and electrical cable.

The TPE system operation was monitored and controlled through a network of pressure gauges and air flow meters. The three monitoring wells surrounding NMW-2A were capped and pressure gauges were installed to monitor in-well vacuum generated by the TPE system. Two sampling ports, located at the primary carbon vessel inlet and the secondary carbon vessel outlet, were used to monitor inlet and outlet VOC concentrations and to ensure compliance with the AQMD permit.

3.1.2 Operation and Performance Monitoring

Following successful installation and debugging of the TPE remedial system, BBLES commenced the two-day pilot testing on October 24, 2006. For approximately 8 hours on each day of operation, the system was run at different operational parameters of

flow and vacuum to determine which parameters work best for the lithologic conditions at the Site. System monitoring included vapor monitoring in accordance with AQMD requirements, system checks, and components maintenance as per vendor specifications.

During system operation, performance monitoring consisted of the following:

- Groundwater elevation measurements of the three monitoring wells using a water level indicator (hourly);
- Vacuum measurements of the extraction well (casing) and the three monitoring wells (15 to 30 minute intervals);
- System parameter measurements of air flow, vacuum, and temperature (15 to 30 minute intervals);
- Vapor VOC sampling by a PID before and after the carbon filters (5 minute intervals for first hour, 15 minute intervals for next hour, and 30 minute intervals or more thereafter, depending on VOC concentration changes);
- Vapor VOC sampling before carbon filters by United States Environmental Protection Agency (EPA) Method 8260B (three per day - 15 minutes after beginning operation, midway through operation, and at end of day); and
- Water VOC sampling of effluent by EPA Method 8260B (once per day).

3.1.3 Results and Observations

During the pilot test, inlet vacuum and the resulting air flow were the key operational parameters to be tested. The TPE system was operated at different inlet vacuums on Day 1 of the study to identify optimum operation parameters, which in turn caused the observed variations in air flow and inlet VOC concentrations. On the second day of TPE pilot testing, the extraction pipe was moved from NMW-2A to the deep screened interval of NMW-11 in order to improve vapor and groundwater extraction. Results and data of the two days of the TPE pilot test are discussed in the following sections. Daily operation and maintenance measurements are included in Table 1. Laboratory analytical reports are attached in Appendix D.

3.1.3.1 System Operation Parameters

The TPE pilot test system was observed to generate an inlet vacuum ranging between 15 inches of mercury (in. Hg) and 27.5 in. Hg. The system was initially operated at 17.5 in. Hg on Day 1, the inlet vacuum was then increased to the maximum (27.5 in. Hg) when the well was dewatered completely. Groundwater extraction flow could not be maintained due to the tight formation of the predominantly clay interval present between 70 and 100 feet bgs at the Site.

On the second day of the TPE test, the extraction pipe and the well casing were perforated to allow for ambient air to enter the well space and assist in pulling groundwater from NMW-2A. This improved groundwater extraction for only a short period due to the slow recharge rate in the well. Consequently, the extraction pipe was moved to the deep screened interval of the adjacent well, NMW-11. As in the NMW-2A case, groundwater extraction was observed initially until the well was completely dewatered after approximately one hour of operation. Air flow fluctuated between 21 scfm and 109 scfm on Day 1 and between 61 scfm and 98 scfm on Day 2. As indicated above, a pressure gauge was installed on top of the TPE well casing to determine vacuum in the extraction wells during the pilot test. Casing vacuum ranged between 3 in. Hg and 8.5 in. Hg on Day 1 and between 0 in. Hg and 10 in. Hg on Day 3.

3.1.3.2 Inlet VOC Concentrations

Inlet VOC concentrations, measured using a hand-held PID, are presented in Table 2. The inlet VOC concentrations and mass removed each day are illustrated in graphs on Figures 3 and 4. VOC levels were generally low on Day 1 and fluctuated between 11 parts per million by volume (ppmv) and 403 ppmv, the latter observed after completely stopping dilution with ambient air. VOC concentrations fluctuated between 6 ppmv and 69 ppmv on Day 2 of TPE pilot testing. The inlet vapor stream was also sampled daily for VOC analysis by EPA Method 8260B. Acetone (4 ppmv), 1,1-DCE (25 ppmv), PCE (4.3 ppmv), TCE (23 ppmv), and 1,1,1-TCA (1.9 ppmv) were the VOCs detected at the highest concentration in the system inlet. Analytical results of the vapor samples are presented in Table 3.

3.1.3.3 Groundwater Extraction Flow

A flow totalizer was used to determine the volume and the flow rate of groundwater extracted during the TPE pilot testing. A total of 116 gallons of groundwater were

pumped from TPE wells NMW-2A and NMW-11D during two days of system operation, resulting in an average flow rate of 0.13 gallons per minute (gpm). Increasing the inlet vacuum did not improve groundwater extraction rate due to the low permeability of the clay-rich interval between approximately 70 and 100 feet bgs.

The extracted groundwater was sampled daily during the pilot test and analyzed for VOCs. A summary of the analytical results is presented in Table 4. Methyl ethyl ketone (MEK), TCE, 1,1-DCE, and PCE were the VOCs detected at the highest concentrations in the effluent, with concentrations as high as 250 micrograms per liter ($\mu\text{g/L}$), 140 $\mu\text{g/L}$, 32 $\mu\text{g/L}$, and 18 $\mu\text{g/L}$, respectively.

3.1.3.4 ROI Parameters

Vacuum measurements in monitoring/SVE wells NMW-11, NMW-12, and NMW-13 revealed no communication between the extraction well and the monitoring wells since negative pressures were not detected in any of the well casings of the three wells (Table 1). Groundwater elevation fluctuations in the monitoring wells were insignificant and minimal drawdown was observed in NMW-11D, the well closest to the extraction well (Table 5, and Figures 5 and 6). Groundwater levels in wells NMW-12D and NMW-13D slightly increased as the TPE pilot test proceeded, possibly due to atmospheric pressure variations.

3.1.3.5 Waste Generation

The TPE technology generated VOC-impacted vapor streams that required treatment prior to release to the atmosphere. Vapor-phase VOCs detected during the pilot test were low (mostly <100 ppmv), and activated carbon breakthrough did not occur during the two-day testing period. In addition to vapor-phase VOCs, the TPE technology generated aqueous-phase VOCs in the groundwater that was extracted from the aquifer at a relatively low flow rate (approximately 0.13 gpm). Over two approximately 8-hour days of pilot testing, the TPE system extracted 116 gallons of groundwater that needed further treatment prior to discharge.

3.2 SVE Pilot Test

The effectiveness of soil vapor extraction technology was investigated on Day 3 of pilot testing at the former Y-12 facility with the shallow screened interval of NMW-11 used as the extraction well.

3.2.1 Remediation System Installation and Debugging

The SVE implemented at the Site consisted of the same aboveground components as the TPE pilot system with the vacuum line connected directly to the top of NMW-11S well casing. A pressure gauge was installed at the well cap to measure vacuum in the well casing during the operation of the SVE system.

The SVE system operation was monitored and controlled through a network of pressure gauges and air flow meters. TPE extraction well (NMW-2A), now used as a monitoring well, was capped and a pressure gauge was installed to monitor in-well vacuum generated by the SVE system. The shallow and deep intervals of wells NMW-12 and NMW-13 were also monitored during this pilot test. The carbon adsorption system inlet and outlet VOC concentrations were monitored throughout the SVE system operation to ensure compliance with the AQMD permit.

3.2.2 Operation and Performance Monitoring

After the completion of TPE testing, SVE pilot system was operated on one day (October 26, 2006) for approximately 9 hours. The system was run at various flow rates and vacuum levels to determine optimum operation parameters for the lithologic conditions. Vapor monitoring was performed in accordance with AQMD requirements.

During SVE system operation, performance monitoring consisted of the following:

- Vacuum measurements of the extraction well (casing) and the shallow and deep screened intervals of the three monitoring wells (15 to 30 minute intervals);
- System parameter measurements of air flow, vacuum, and temperature (15 to 30 minute intervals);
- Vapor VOC sampling by a PID before and after the carbon filters (5 minute intervals for first hour, 15 minute intervals for next hour, and 30 minute intervals or more thereafter, depending on VOC concentration changes); and
- Vapor VOC sampling before carbon filters by EPA Method 8260B (three per day - 15 minutes after beginning operation, midway through operation, and at end of day).

The SVE system did not generate any liquid waste requiring VOC analysis. At the end of TPE and SVE pilot testing, a sample of liquid was taken from the storage tank for waste profiling and disposal purposes.

3.2.3 Results and Observations

SVE system operation and monitoring results are discussed in the following subsections. Daily operation and performance measurements are included in Table 6. Laboratory analytical reports are attached in Appendix D.

3.2.3.1 System Operation Parameters

As in the case of TPE technology, vacuum and air flow were the two critical parameters to be investigated. The SVE pilot system was operated at different vacuums throughout the 9-hr testing period (10 in. Hg, 12.5 in. Hg, 15 in. Hg, and 17.5 in. Hg). As expected, the air flow was observed to decrease as the inlet vacuum increased and ranged between 102.5 ± 5.6 scfm at 17.5 in. Hg and 140.1 ± 1.3 scfm at 10 in. Hg. Vacuum was not detected in the extraction well NMW-11. In fact, a positive pressure was detected in the well casing, indicating a lithology with high permeability between ground surface and 70 feet bgs.

3.2.3.2 Inlet VOC Concentrations

Table 7 presents the VOC concentrations measured in the vapor inlet during the SVE pilot test with concentrations consistently exceeding the PID maximum reading of 9,999 ppmv. Inlet VOC concentrations and mass removed are illustrated in Figure 7. The inlet vapor stream was also sampled for VOC analysis by EPA Method 8260B shortly following system startup, midway through operation, and at the end of the SVE pilot testing. The highest detected contaminants were 1,1-dichloroethane (1,1-DCA, 1.2 ppmv to 1.8 ppmv), 1,1-DCE (540 ppmv to 600 ppmv), methylene chloride (50 ppmv to 83 ppmv), PCE (140 ppmv to 210 ppmv), toluene (3 ppmv to 5.6 ppmv), TCE (550 ppmv to 680 ppmv), and 1,1,1-TCA (16 ppmv to 23 ppmv). Analytical results of the vapor samples are presented in Table 3.

3.2.3.3 ROI Parameters

The negative pressure gradient generated by SVE systems induces the movement of subsurface vapors towards the extraction well(s). In general, the lower the inlet vacuum, the higher the air flow and the induced vacuum in the surrounding monitoring

wells. However, the SVE technology does not involve the extraction of groundwater. Accordingly, the vapor radius of influence is the key parameter taken into consideration when investigating the implementability of SVE and in the design of remedial systems. As shown in Table 6 and Figures 8 and 9, negative pressures were detected in the shallow wells NMW-12 and NMW-13, as well as the deep screened interval of NMW-11, with vacuum being highest in the shallow NMW-12 completion which was installed approximately 18 feet from the extraction well, NMW-11. The observed vacuum was lower 48 feet away in NMW-13. Thus, the vapor radius of influence was estimated at approximately 50 feet. Vacuum was also detected in the deep screened intervals of NMW-11 and NMW-12 and in the single-completion well NMW-2A (screened between 85 and 95 feet bgs).

3.2.3.4 Waste Generation

During the investigation of SVE technology, only VOC-impacted vapor streams were produced. Vapor-phase VOCs were detected at very high concentrations that exceeded 9,999 ppmv throughout SVE pilot testing. In general, the only liquid waste generated from SVE remedial systems was the condensate that accumulated in the air/water separator. Due to the short duration of SVE testing at the former Y-12 facility, a minimal amount of condensate was produced and pumped into the storage tank onsite.

4. Pilot Testing Evaluation

In this section, the TPE and SVE technologies are compared and evaluated according to two criteria that are discussed below in order to determine the most effective remedial alternative for full-scale implementation at the Site: radius of influence and mass removal.

4.1 TPE

During pilot testing of TPE technology at the former Y-12 facility, ROI and VOC mass removal were investigated.

4.1.1 ROI

Radius of influence is defined as the greatest distance from an extraction well at which a sufficient vacuum and vapor flow can be induced to adequately enhance volatilization and extraction of the contaminants in the soil. Radius of influence is the most important parameter to be considered in the design of the TPE system and is the major criterion in evaluating the applicability and effectiveness of a remedial technology. In the TPE pilot test case, two types of ROI values can be distinguished: (1) the vapor ROI which corresponds to the distance from the extraction well where a vacuum of at least 1 inch of water is detected and (2) the hydraulic ROI which can be determined by evaluating the effect of distance from the extraction well on the elevation and drawdown of groundwater in the surrounding monitoring wells. TPE pilot testing at the Site showed minimal groundwater elevation variations, as well as the absence of vacuum in the monitoring wells surrounding the TPE well. Thus, both the hydraulic and vapor radii of influence were insignificant. Based on these results, TPE is not considered a viable remedial alternative at the former Y-12 facility.

4.1.2 Mass Removal

The removal rate of VOCs at the Site was determined for each technology by dividing the total recovered mass by the duration of operation. Relatively low VOC concentrations were detected in the extracted vapor stream during the TPE pilot test. The total mass of VOCs extracted for approximately 6 hours of operation on Day 1 was only 0.42 pounds as hexane. On Day 2 of the TPE test, the VOC mass removed was 0.24 pounds as hexane over approximately 8 hours with inlet concentrations varying between 6 ppmv and 69 ppmv. Such a low mass removal rate considerably extends

the treatment period and renders TPE technology ineffective in remediating soil and groundwater at the Site.

4.2 SVE

Both ROI and mass removal were taken into consideration to evaluate the efficiency of SVE technology and its implementability at the Site.

4.2.1 ROI

Subsurface vapors were extracted from the shallow screened interval of well NMW-11 generating vacuum in the shallow wells NMW-12 and NMW-13, the latter located approximately 48 feet away from the extraction well. In addition, the detection of negative pressures in NMW-2A and in the deep screened intervals of NMW-11 and NMW-12 indicates communication between the shallow unsaturated zone and the semi-perched groundwater zone underneath. Therefore, implementing SVE technology at the Site would remediate soils in vertical and lateral zones.

4.2.2 Mass Removal

Inlet VOC concentrations, measured using a hand-held PID, during the SVE pilot test exceeded 9,999 ppmv at all times during the test. Consequently, the total mass of VOCs (as hexane) extracted over approximately 9 hours of operation is estimated to have exceeded 142 pounds. This amount of mass removal reflects the initial conditions in the subsurface and would be expected to significantly decline and stabilize with long term SVE operation.

5. Conclusions and Recommendations

TPE and SVE pilot testing was performed at the NGSC former Y-12 facility for a total period of three days with the system run under various inlet vacuum and flow conditions to determine the optimal operation parameters for the lithologic conditions present at the Site. During this pilot testing, the efficiency of each remedial technology at reducing the levels of chlorinated VOCs at the Site was evaluated. The findings and conclusions of the TPE/SVE pilot system operation are listed below:

- The TPE system was operated continuously for approximately 8 hours per day during the two-day pilot test. On the third day, SVE technology was tested for approximately 9 hours;
- A total of 116 gallons of groundwater was extracted from the semi-perched groundwater zone during TPE pilot implementation. Two deep wells, NMW-2A and NMW-11, were alternately utilized for groundwater extraction in order to increase the flow rate. No groundwater was pumped out of the aquifer during SVE pilot testing;
- TPE application at the Site did not produce significant groundwater drawdown in any of the monitoring wells located in the vicinity of the groundwater/vapor extraction well. Minimal groundwater elevation fluctuations were also observed during SVE pilot system operation. Thus, neither remedial technology provided hydraulic control of the VOC-impacted semi-perched groundwater;
- Due to the low permeability of the soil in the deeper zones, vacuum was not observed in any of the monitoring wells surrounding the TPE well. However when soil vapor was extracted from the shallow interval of NMW-11, vacuum was detected as far as 48 feet from the SVE well. Thus, the vapor radius of influence of the SVE pilot system was estimated at approximately 50 feet. Communication between the shallow unsaturated zone and the semi-perched zone was observed following the detection of negative pressures in the deep well NMW-2A and the deep screened interval of well NMW-12;
- VOC levels as measured with a PID were generally low during TPE pilot test and fluctuated between 11 ppmv and 403 ppmv on Day 1 and between 6 ppmv and 69 ppmv on Day 2. This low yield indicates that a TPE system would have a

very low expected VOC removal rate. Conversely, VOC concentrations exceeded 9,999 ppmv throughout SVE testing duration independent of the operating conditions. Field, PID measurements of the vapor stream are an indication of the comparative superiority of the SVE technology at extracting VOCs from the vadose zone soil;

- In conclusion, the higher VOC removal efficiency and the more significant radius of influence associated with the SVE system indicated the superiority of SVE over TPE for potential full-scale implementation at the Site ; and
- The SVE pilot test generated essential data to successfully develop site-specific engineering design parameters for potential full-scale application once the treatment area is defined.

6. References

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Orange County Water District. 1991. *Phase I Hydrogeologic Investigation of Chlorinated VOC Contamination in the Anaheim/Fullerton Area* (May 1991).

URS Corporation. 2004. *Workplan – Groundwater Remediation Plan, Former Y-12 Facility, 301 Orangethorpe Avenue, Anaheim, California* (October 12, 2004).

Tables

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Tables

TABLE 1
OPERATION AND PERFORMANCE MONITORING
TPE PILOT TEST (DAY 1)

NORTHROP GRUMMAN SYSTEMS CORPORATION
FORMER Y-12 FACILITY, ANAHEIM, CA

Time	SVE Operation Parameters					TPE Well	Groundwater Monitoring Well Vacuum (in. H ₂ O)						Extracted Groundwater		
	Air Pressure (in. H ₂ O)	Air Flow (scfm)	Vacuum (in. Hg)	Inlet/Outlet Temperature (°F)	Blower Vacuum (in. Hg)		Casing Vacuum (in. Hg)	NMW-11		NMW-12		NMW-13		Volume (gallons)	Rate (gpm)
								Shallow	Deep	Shallow	Deep	Shallow	Deep		
0955	-	-	-	-	-	-	-	-	-	-	-	-	79825	-	
1000	1.15	102.46	17.5	194/73	22.5	8.5	0.0	0.0	0.0	0.3	0.0	0.0	79836	2.2	
1010	1.15	102.46	17.5	193/72	23.0	5.0	0.0	0.0	0.2	0.0	0.2	0.0	79836	-	
1025	1.25	109.00	17.5	195/74	24.0	4.0	0.3	0.0	0.2	0.0	0.2	0.0	79836	-	
1040	1.15	102.46	17.5	196/74	24.0	3.0	0.2	0.0	0.1	0.0	0.1	0.0	79836	-	
1055	1.10	101.37	17.5	197/75	24.5	3.0	0.2	0.0	0.0	0.0	0.0	0.0	79836	-	
1125	1.10	101.37	17.0	198/76	25.0	3.0	0.0	0.0	0.0	0.0	0.0	0.0	79836	-	
1155	1.15	102.46	17.0	199/79	25.0	3.0	0.0	0.0	0.0	0.0	0.0	0.0	79836	-	
1225	1.10	101.37	17.0	200/81	25.0	3.0	0.0	0.0	0.0	0.0	0.0	0.0	79836	-	
1255	1.15	102.46	17.5	201/82	24.5	3.0	0.1	0.0	0.1	0.0	0.2	0.0	79836	-	
1325	1.15	102.46	17.5	201/83	24.0	3.0	0.0	0.0	0.0	0.0	0.0	0.0	79836	-	
1330	DILUTION VALVE COMPLETELY CLOSED														
1345	0.10	30.74	27.5	189/88	>30	3.0	0.0	0.0	0.0	0.0	0.0	0.0	79836	-	
1400	0.20	43.60	27.0	185/86	>30	4.0	0.0	0.0	0.0	0.0	0.0	0.0	79836	-	
1430	0.10	30.74	27.5	183/78	>30	4.0	0.0	0.0	0.0	0.0	0.0	0.0	79836	-	
1500	0.05	21.58	27.5	181/76	>30	4.0	0.0	0.0	0.0	0.0	0.0	0.0	79836	-	
1530	0.15	37.93	27.5	178/74	>30	4.0	0.0	0.0	0.0	0.0	0.0	0.0	79836	-	
1600	0.05	21.58	27.0	178/73	>30	4.0	0.0	0.0	0.0	0.0	0.0	0.0	79836	-	
1628	TPE SYSTEM SHUT DOWN, STINGER REMOVED, SYSTEM OPERATED IN SVE MODE														
1634	1.25	109.00	15.0	184/76	19.5	14.0	0.0	0.0	0.0	0.0	0.0	0.0	79836	-	
1644	1.10	101.37	17.5	191/73	22.5	16.0	0.0	0.0	0.0	0.0	0.0	0.0	79836	-	
1652	0.75	82.84	20.0	193/72	25.5	18.0	0.0	0.0	0.0	0.0	0.0	0.0	79836	-	
1700	0.45	66.49	22.5	193/70	28.0	21.5	0.0	0.0	0.0	0.0	0.0	0.0	79836	-	
1705	SVE SYSTEM SHUT DOWN														

NOTES:

Baseline Observations
SVE- Soil vapor extraction
TPE- Two-phase extraction
in. H₂O- Inches of water
scfm- Standard cubic feet per minute
in. Hg- Inches of mercury
°F- Degrees Fahrenheit
gpm- Gallons per minute

TABLE 1
OPERATION AND PERFORMANCE MONITORING
TPE PILOT TEST (DAY 2)

NORTHROP GRUMMAN SYSTEMS CORPORATION
FORMER Y-12 FACILITY, ANAHEIM, CA

Time	SVE Operation Parameters					TPE Well	Groundwater Monitoring Well Vacuum (in. H ₂ O)						Extracted Groundwater		
	Air Pressure (in. H ₂ O)	Air Flow (scfm)	Vacuum (in. Hg)	Inlet/Outlet Temperature (°F)	Blower Vacuum (in. Hg)		Casing Vacuum (in. Hg)	NMW-11		NMW-12		NMW-13		Volume (gallons)	Rate (gpm)
								Shallow	Deep	Shallow	Deep	Shallow	Deep		
0830	-	-	-	-	-	-	-	-	-	-	-	-	79837	-	
0835	0.45	61.04	20.0	162/60	22.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	79837	-	
0845	0.45	62.13	20.0	179/61	23.5	2.5	0.0	0.0	0.0	0.0	0.0	0.0	79847	0.67	
0900	0.45	62.20	20.0	186/62	25.0	3.0	0.0	0.0	0.0	0.0	0.0	0.0	79847	-	
0915	0.45	63.22	20.5	188/64	26.0	3.0	0.0	0.0	0.0	0.0	0.0	0.0	79847	-	
0930	0.45	63.22	20.5	189/64	26.0	3.0	0.0	0.0	0.0	0.0	0.0	0.0	79847	-	
1000	0.50	67.58	20.5	191/64	26.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	79858	0.15	
1030	0.75	82.84	19.0	193/68	26.0	10.0	0.0	0.0	0.0	0.0	0.0	0.0	79858	-	
1100	0.90	91.56	18.5	195/72	25.5	7.0	0.0	0.0	0.0	0.0	0.0	0.0	79868	0.17	
1130	0.95	93.74	18.5	196/75	26.0	7.0	0.0	0.0	0.0	0.0	0.0	0.0	79868	-	
1200	1.05	98.10	18.0	197/76	26.0	5.0	0.0	0.0	0.0	0.0	0.0	0.0	79868	-	
1230	1.05	98.10	18.5	198/77	25.5	5.0	0.0	0.0	0.0	0.0	0.0	0.0	79868	-	
1348	0.75	82.84	20.5	199/79	26.5	9.0	0.0	0.0	0.0	0.0	0.0	0.0	79868	-	
1440	MOVED TO DEEP SCREENED INTERVAL OF NMW-11 FOR GW EXTRACTION														
1450	0.80	87.20	20.5	199/76	26.0	0.0	0.0	NA	0.0	0.0	0.0	0.0	79879	1.10	
1600	0.80	87.20	20.0	197/73	26.5	0.0	0.0	NA	0.0	0.0	0.0	0.0	79892	0.19	
1615	0.90	91.56	20.0	197/73	26.5	0.0	0.0	NA	0.0	0.0	0.0	0.0	79892	-	
1625	TPE SYSTEM SHUT DOWN														
1645	SVE CONNECTED TO SHALLOW SCREENED INTERVAL OF NMW-11, SVE SYSTEM TURNED ON														
1650	1.40	115.54	15.0	192/72	22.0	0.0	0.0	NA	0.8	0.0	0.0	0.0	79900	0.16	
1700	SVE SYSTEM SHUT DOWN														

NOTES:

Baseline Observations
SVE- Soil vapor extraction
TPE- Two-phase extraction
in. H₂O- Inches of water
scfm- Standard cubic feet per minute
in. Hg- Inches of mercury
°F- Degrees Fahrenheit
gpm- Gallons per minute
NA - Not applicable

TABLE 2
FIELD VAPOR VOC CONCENTRATIONS (PID)
TPE PILOT TEST (DAY 1)

NORTHROP GRUMMAN SYSTEMS CORPORATION
FORMER Y-12 FACILITY, ANAHEIM, CA

Time	Operation Period (hours)	PID Measurements (ppmv)	
		Before Carbon Vessels	After Carbon Vessels
1000	0.08	45.2	38.3 [†]
1005	0.17	42.6	39.9 [†]
1010	0.25	37.2	8.8 [‡]
1015	0.33	25.5	7.8 [‡]
1020	0.42	24.5	5.8 [‡]
1025	0.50	26.0	6.9 [‡]
1030	0.58	27.7	6.9 [‡]
1035	0.67	28.3	6.2 [‡]
1040	0.75	26.6	5.8 [‡]
1045	0.83	26.9	6.9 [‡]
1050	0.92	27.4	10.2 [‡]
1055	1.00	25.6	9.2 [‡]
1110	1.25	23.9	5.9 [‡]
1125	1.50	20.5	6.7 [‡]
1140	1.45	16.5	3.8
1155	2.00	16.7	0.0
1225	2.50	16.3	3.3
1255	3.00	11.9	0.0
1325	3.50	10.9	0.0
1345	3.83	189.0	0.0
1400	4.08	233.0	0.0
1430	4.58	275.0	0.0
1500	5.08	365.0	0.0
1530	5.58	383.0	0.0
1600	6.08	403.0	0.0
1635	0.12	39.3	3.7 [†]
1645	0.28	28.5	0.0
1653	0.42	38.5	0.0
1700	0.53	60.2	0.0

NOTES:

PID- Photoionization detector

ppmv - Parts per million by volume

At 1330, dilution valve was completely closed

After 1628, system was operated as SVE after pulling the stinger out the well

[†] - Possible cross-contamination from pump head

[‡] - PID readings in ambient air between 2.5 ppm and 5 ppm

**TABLE 2
FIELD VAPOR VOC CONCENTRATIONS (PID)
TPE PILOT TEST (DAY 2)**

**NORTHROP GRUMMAN SYSTEMS CORPORATION
FORMER Y-12 FACILITY, ANAHEIM, CA**

Time	Operation Period (hours)	PID Measurements (ppmv)	
		Before Carbon Vessels	After Carbon Vessels
0835	0.08	69.1	4.4 [†]
0840	0.17	64.4	2.8 [†]
0845	0.25	58.9	0.0
0850	0.33	56.6	0.0
0855	0.42	54.7	0.2
0900	0.50	52.2	0.0
0905	0.58	51.1	0.0
0910	0.67	50.2	0.2
0915	0.75	49.7	0.0
0920	0.83	51.2	0.0
0925	0.92	49.6	0.0
0930	1.00	49.5	0.2
0945	1.25	54.1	0.0
1000	1.50	19.9	0.0
1015	1.75	29.8	0.0
1030	2.00	40.2	0.0
1100	2.50	27.8	0.0
1130	3.00	26.9	0.0
1200	3.50	20.0	0.0
1230	4.00	19.9	0.0
1300	4.50	19.6	0.0
1330	5.00	30.8	0.0
1405	5.58	28.9	0.0
1453	6.38	6.0	0.0
1458	6.47	7.0	0.0
1503	6.55	55.3	0.0
1508	6.63	27.2	0.0
1513	6.72	31.4	0.0
1518	6.80	34.2	0.0
1525	6.92	31.8	0.0
1530	7.00	21.6	0.0
1538	7.13	34.8	0.0
1545	7.25	52.8	0.0
1600	7.50	16.8	0.0
1615	7.75	16.1	0.0
1650	8.33	>9999*	0.0

NOTES:

PID- Photoionization detector

ppmv - Parts per million by volume

At 1440, started extracting groundwater from deep screened interval of NMW-11

*At 1645, SVE connected to shallow screened interval of NMW-11

[†] - High PID reading might be due to high humidity in the morning

TABLE 3
LABORATORY VAPOR INLET VOC CONCENTRATIONS
TPE/SVE PILOT TEST

NORTHROP GRUMMAN SYSTEMS CORPORATION
FORMER Y-12 FACILITY, ANAHEIM, CA

Site ID:	INLET-A	INLET-A	INLET-A	INLET-B	INLET-B	INLET-B	INLET-B	INLET-C	INLET-C	INLET-C
Sample ID:	Inlet-102406-A	Inlet-102506-A	Inlet-102606-A	Inlet-102406-B	Inlet-102406-B	Inlet-102606-B	Inlet-102606-B	Inlet-102406-C	Inlet-102506-C	Inlet-102606-C
Sample Date:	10/24/06	10/25/06	10/26/06	10/24/06	10/24/06	10/25/06	10/26/06	10/24/06	10/25/06	10/26/06
Method:	TO-15									
Units:	ppbv									
ANALYTE										
Acetone	38	19	ND<3300	43	37	19	3700	4000 D	15	ND<3600
Benzene	1.1	1.0	ND<830	0.53	ND<0.50	0.66	ND<900	6.9	0.71	ND<900
Benzyl chloride	ND<1.0	ND<1.0	ND<1700	ND<1.0	ND<1.0	ND<1.0	ND<1800	ND<8.0	ND<1.0	ND<1800
Bromoform	ND<0.50	ND<0.50	ND<830	ND<0.50	ND<0.50	ND<0.50	ND<900	ND<4.0	ND<0.50	ND<900
Bromomethane	ND<0.50	ND<0.50	ND<830	ND<0.50	ND<0.50	ND<0.50	ND<900	ND<4.0	ND<0.50	ND<900
Carbon disulfide	3.4	3.0	ND<830	3.1	3.1	3.4	ND<900	4.1	3.3	ND<900
Carbon Tetrachloride	ND<0.50	ND<0.50	ND<830	ND<0.50	ND<0.50	ND<0.50	ND<900	ND<4.0	ND<0.50	ND<900
Chlorobenzene	ND<0.50	ND<0.50	ND<830	ND<0.50	ND<0.50	ND<0.50	ND<900	ND<4.0	ND<0.50	ND<900
Chloroethane	ND<0.50	ND<0.50	ND<830	ND<0.50	ND<0.50	ND<0.50	ND<900	ND<4.0	ND<0.50	ND<900
Chloroform	0.65	2.6	ND<830	0.78	0.73	1.1	ND<900	35	0.81	ND<900
Chloromethane	0.70	0.58	ND<830	0.68	0.79	0.57	ND<900	ND<4.0	0.58	ND<900
Dibromochloromethane	ND<0.50	ND<0.50	ND<830	ND<0.50	ND<0.50	ND<0.50	ND<900	ND<4.0	ND<0.50	ND<900
1,2-Dibromoethane (EDB)	ND<0.50	ND<0.50	ND<830	ND<0.50	ND<0.50	ND<0.50	ND<900	ND<4.0	ND<0.50	ND<900
1,2-Dichlorobenzene	ND<0.50	ND<0.50	ND<830	ND<0.50	ND<0.50	ND<0.50	ND<900	ND<4.0	ND<0.50	ND<900
1,3-Dichlorobenzene	ND<0.50	ND<0.50	ND<830	ND<0.50	ND<0.50	ND<0.50	ND<900	ND<4.0	ND<0.50	ND<900
1,4-Dichlorobenzene	ND<0.50	ND<0.50	ND<830	ND<0.50	ND<0.50	ND<0.50	ND<900	ND<4.0	ND<0.50	ND<900
Dichlorobromomethane	ND<0.50	ND<0.50	ND<830	ND<0.50	ND<0.50	ND<0.50	ND<900	ND<4.0	ND<0.50	3100
1,1-Dichloroethane	2.4	9.3	1600	3.1	2.8	3.6	1800	130	3.3	1200
1,2-Dichloroethane	0.51	2.2	ND<830	0.54	ND<0.50	0.65	ND<900	21	ND<0.50	ND<900
1,1-Dichloroethene	370 D	1400 D	540000 D	510 D	410 D	1400 D	600000 D	25000 D	1300 D	580000 D
cis-1,2-Dichloroethene	ND<0.50	2.9	ND<830	0.62	0.59	0.99	ND<900	28	1.3	ND<900
trans-1,2-Dichloroethene	ND<0.50	1.7	ND<830	ND<0.50	ND<0.50	0.67	ND<900	24	1.6	ND<900
1,2-Dichloropropane	ND<0.50	ND<0.50	ND<830	ND<0.50	ND<0.50	ND<0.50	ND<900	ND<4.0	ND<0.50	ND<900
cis-1,3-Dichloropropene	ND<0.50	ND<0.50	ND<830	ND<0.50	ND<0.50	ND<0.50	ND<900	ND<4.0	ND<0.50	ND<900
trans-1,3-Dichloropropene	ND<1.0	ND<1.0	ND<1700	ND<1.0	ND<1.0	ND<1.0	ND<1800	ND<8.0	ND<1.0	ND<1800
4-Ethyl Toluene	41	ND<0.50	ND<830	ND<0.50	ND<0.50	ND<0.50	ND<900	27	ND<0.50	ND<900
Ethylbenzene	19	ND<0.50	ND<830	ND<0.50	ND<0.50	ND<0.50	ND<900	17	ND<0.50	ND<900
Freon 11 (Trichlorofluoromethane)	ND<1.0	ND<1.0	ND<1700	ND<1.0	ND<1.0	ND<1.0	ND<1800	ND<8.0	ND<1.0	ND<1800
Freon 113 (1,1,2-trichloro-1,2,2-trifluoroethane)	ND<1.0	2.4	ND<1700	ND<1.0	ND<1.0	1.1	ND<1800	37	ND<1.0	ND<1800
Freon 114 (1,2-Dichlorotetrafluoroethane)	ND<2.0	ND<2.0	ND<3300	ND<2.0	ND<2.0	ND<2.0	ND<3600	ND<16	ND<2.0	ND<3600
Freon 12 (Dichlorodifluoromethane)	0.63	0.71	ND<830	0.60	0.63	0.55	ND<900	ND<4.0	0.53	ND<900
Hexachlorobutadiene	ND<1.0	ND<1.0	ND<1700	ND<1.0	ND<1.0	ND<1.0	ND<1800	ND<8.0	ND<1.0	ND<1800
2-Hexanone	ND<1.0	ND<1.0	ND<1700	ND<1.0	ND<1.0	ND<1.0	ND<1800	ND<8.0	ND<1.0	ND<1800
Methyl Ethyl Ketone	43	26	ND<1700	45	36	12	ND<1800	360	7.7	ND<1800
Methyl isobutyl ketone (MIBK)	ND<1.0	ND<1.0	ND<1700	ND<1.0	ND<1.0	ND<1.0	ND<1800	ND<8.0	ND<1.0	ND<1800
Methyl Tert-butyl ether (MTBE)	ND<2.0	ND<2.0	ND<3300	ND<2.0	ND<2.0	ND<2.0	ND<3600	ND<16	ND<2.0	ND<3600
Methylene chloride	12	16	62000	ND<10	ND<10	13	83000	ND<80	12	50000
Styrene	ND<1.0	ND<1.0	ND<1700	ND<1.0	ND<1.0	ND<1.0	2100	ND<8.0	ND<1.0	3100
1,1,2,2-Tetrachloroethane	ND<1.0	ND<1.0	ND<1700	ND<1.0	ND<1.0	ND<1.0	ND<1800	ND<8.0	ND<1.0	ND<1800
Tetrachloroethene	110 D	1300 D	140000 D	170 D	140 D	590 D	210000 D	4300 D	260 D	180000 D
Toluene	14	2.4	3000	2.8	2.0	2.6	4300	15	1.8	5600
1,2,4-Trichlorobenzene	ND<1.0	ND<1.0	ND<1700	ND<1.0	ND<1.0	ND<1.0	ND<1800	ND<8.0	ND<1.0	ND<1800
1,1,1-Trichloroethane	30	150 D	19000	37	26	40	23000	1900 D	29	16000
1,1,2-Trichloroethane	0.83	5.5	ND<830	1.2	1.5	1.6	ND<900	34	1.2	ND<900
Trichloroethene	330 D	3400 D	550000 D	600 D	460 D	1700 D	680000 D	23000 D	1700 D	600000 D
1,2,4-Trimethylbenzene	68 D	1.1	ND<1700	1.8	ND<1.0	ND<1.0	ND<1800	140	ND<1.0	ND<1800
1,3,5-Trimethylbenzene	20 D	ND<0.50	ND<830	ND<0.50	ND<0.50	ND<0.50	ND<900	42	ND<0.50	ND<900
Vinyl Acetate	ND<1.0	ND<1.0	ND<1700	ND<1.0	ND<1.0	ND<1.0	ND<1800	ND<8.0	ND<1.0	ND<1800
Vinyl Chloride	ND<0.50	ND<0.50	ND<830	ND<0.50	ND<0.50	ND<0.50	ND<900	ND<4.0	0.85	ND<900
o-Xylene	23 D	0.53	ND<830	0.88	ND<0.50	0.52	ND<900	54	ND<0.50	ND<900
p/m-Xylene	88	1.1	ND<1700	1.9	1.1	1.3	ND<1800	79	ND<1.0	2100

NOTES:

ID- Sample identification
ppb- Parts per billion by volume
ND<0.5- Analyte not detected at reporting limit shown
The "D" flag indicates the result is from a diluted sample

TABLE 4
VOLATILE ORGANIC COMPOUND CONCENTRATIONS IN EXTRACTED GROUNDWATER
TPE PILOT TEST

NORTHROP GRUMMAN SYSTEMS CORPORATION
FORMER Y-12 FACILITY, ANAHEIM, CA

Site ID:	GW-EFFL- NMW02A	GW-EFFL- NMW11	IDW-061026
Sample ID:	GW-102406	GW-102506	COMP-102606
Sample Date:	10/24/06	10/25/06	10/26/06
Method:	8260B		
Units:	µg/l		
ANALYTE			
Acetone	ND<100	ND<50	ND<50
Benzene	ND<1.0	ND<0.50	ND<0.50
Bromobenzene	ND<2.0	ND<1.0	ND<1.0
Bromochloromethane	ND<2.0	ND<1.0	ND<1.0
Bromoforn	ND<2.0	ND<1.0	ND<1.0
Bromomethane	ND<2.0	ND<1.0	ND<1.0
n-Butylbenzene	ND<2.0	ND<1.0	ND<1.0
sec-Butylbenzene	ND<2.0	ND<1.0	ND<1.0
Carbon disulfide	ND<20	ND<10	ND<10
Carbon Tetrachloride	ND<1.0	ND<0.50	ND<0.50
Chlorobenzene	ND<2.0	ND<1.0	ND<1.0
Chloroethane	ND<2.0	ND<1.0	ND<1.0
Chloroform	ND<2.0	ND<1.0	ND<1.0
Chloromethane	ND<20	ND<10	ND<10
2-Chlorotoluene	ND<2.0	ND<1.0	ND<1.0
4-Chlorotoluene	ND<2.0	ND<1.0	ND<1.0
1,2-Dibromo-3-chloropropane	ND<10	ND<5.0	ND<5.0
Dibromochloromethane	2.3	ND<1.0	ND<1.0
1,2-Dibromoethane (EDB)	ND<2.0	ND<1.0	ND<1.0
Dibromomethane	ND<2.0	ND<1.0	ND<1.0
1,2-Dichlorobenzene	ND<2.0	ND<1.0	ND<1.0
1,3-Dichlorobenzene	ND<2.0	ND<1.0	ND<1.0
1,4-Dichlorobenzene	ND<2.0	ND<1.0	ND<1.0
Dichlorobromomethane	2.8	ND<1.0	ND<1.0
1,1-Dichloroethane	ND<2.0	ND<1.0	ND<1.0
1,2-Dichloroethane	ND<1.0	ND<0.50	0.81
1,1-Dichloroethene	ND<2.0	1.4	32
cis-1,2-Dichloroethene	ND<2.0	ND<1.0	ND<1.0
trans-1,2-Dichloroethene	ND<2.0	ND<1.0	ND<1.0
1,2-Dichloropropane	ND<2.0	ND<1.0	ND<1.0
1,3-Dichloropropane	ND<2.0	ND<1.0	ND<1.0
2,2-Dichloropropane	ND<2.0	ND<1.0	ND<1.0
1,1-Dichloropropene	ND<2.0	ND<1.0	ND<1.0
cis-1,3-Dichloropropene	ND<1.0	ND<0.50	ND<0.50
trans-1,3-Dichloropropene	ND<1.0	ND<0.50	ND<0.50
Ethylbenzene	ND<2.0	ND<1.0	ND<1.0
Freon 11 (Trichlorofluoromethane)	ND<20	ND<10	ND<10
Freon 113 (1,1,2-trichloro-1,2,2-trifluoroethane)	ND<20	ND<10	ND<10
Freon 12 (Dichlorodifluoromethane)	ND<2.0	ND<1.0	ND<1.0
2-Hexanone	ND<20	ND<10	ND<10
Isopropylbenzene	ND<2.0	ND<1.0	ND<1.0
p-Isopropyltoluene	ND<2.0	ND<1.0	ND<1.0
Methyl Ethyl Ketone	250	ND<10	ND<10
Methyl isobutyl ketone (MIBK)	ND<20	ND<10	ND<10
Methyl Tert-butyl ether (MTBE)	ND<2.0	ND<1.0	ND<1.0
Methylene chloride	ND<20	ND<10	ND<10
Naphthalene	ND<20	ND<10	ND<10
n-Propylbenzene	ND<2.0	ND<1.0	ND<1.0
Styrene	ND<2.0	ND<1.0	ND<1.0
tert-Butylbenzene	ND<2.0	ND<1.0	ND<1.0
1,1,1,2-Tetrachloroethane	ND<2.0	ND<1.0	ND<1.0
1,1,2,2-Tetrachloroethane	ND<2.0	ND<1.0	ND<1.0
Tetrachloroethene	ND<2.0	1.1	18
Toluene	ND<2.0	ND<1.0	ND<1.0
1,2,3-Trichlorobenzene	ND<2.0	ND<1.0	ND<1.0
1,2,4-Trichlorobenzene	ND<2.0	ND<1.0	ND<1.0
1,1,1-Trichloroethane	ND<2.0	ND<1.0	3.5
1,1,2-Trichloroethane	ND<2.0	ND<1.0	2.5
Trichloroethene	ND<2.0	6.6	140
1,2,3-Trichloropropane	ND<10	ND<5.0	ND<5.0
1,2,4-Trimethylbenzene	ND<2.0	ND<1.0	ND<1.0
1,3,5-Trimethylbenzene	ND<2.0	ND<1.0	ND<1.0
Vinyl Acetate	ND<20	ND<10	ND<10
Vinyl Chloride	ND<1.0	ND<0.50	ND<0.50
p-Xylene	ND<2.0	ND<1.0	ND<1.0
p/m-Xylene	ND<2.0	ND<1.0	ND<1.0

NOTES:

ID- Sample identification

µg/L- Micrograms per liter

ND<1.0- Analyte not detected at reporting limit shown

COMP-102606 is a composite sample taken from the extracted groundwater storage tank

TABLE 5
SUMMARY OF GROUNDWATER WELL MEASUREMENTS
TPE PILOT TEST (DAY 1)

NORTHROP GRUMMAN SYSTEMS CORPORATION
FORMER Y-12 FACILITY, ANAHEIM, CA

Time	Operation Period (hours)	NMW-11			NMW-12			NMW-13		
		Depth to Water (feet bgs)	Drawdown (feet)	Elevation (feet msl)	Depth to Water (feet bgs)	Drawdown (feet)	Elevation (feet msl)	Depth to Water (feet bgs)	Drawdown (feet)	Elevation (feet msl)
0955	0	76.53	0.00	84.96	78.66	0.00	82.57	77.35	0.00	83.88
1010	0.25	76.57	0.04	84.92	78.58	-0.08	82.65	77.30	-0.05	83.93
1055	1	76.58	0.05	84.91	78.52	-0.14	82.71	77.28	-0.07	83.95
1155	2	76.6	0.07	84.89	78.47	-0.19	82.76	77.23	-0.12	84.00
1255	3	76.57	0.04	84.92	78.41	-0.25	82.82	77.19	-0.16	84.04
1430	4.58	76.57	0.04	84.92	78.35	-0.31	82.88	77.13	-0.22	84.10
1530	5.58	76.55	0.02	84.94	78.31	-0.35	82.92	77.11	-0.24	84.12

NOTES:

Baseline Observations

bgs - Below ground surface

msl - Mean sea level

At 1330, dilution valve was completely closed

TABLE 5
SUMMARY OF GROUNDWATER WELL MEASUREMENTS
TPE PILOT TEST (DAY 2)

NORTHROP GRUMMAN SYSTEMS CORPORATION
FORMER Y-12 FACILITY, ANAHEIM, CA

Time	Operation Period (hours)	NMW-11			NMW-12			NMW-13		
		Depth to Water (feet bgs)	Drawdown (feet)	Elevation (feet msl)	Depth to Water (feet bgs)	Drawdown (feet)	Elevation (feet msl)	Depth to Water (feet bgs)	Drawdown (feet)	Elevation (feet msl)
0830	0	76.60	0.07	84.89	77.90	-0.76	83.33	76.92	-0.43	84.31
0930	1	76.62	0.09	84.87	77.86	-0.80	83.37	76.91	-0.44	84.32
1030	2	76.66	0.13	84.83	77.85	-0.81	83.38	76.91	-0.44	84.32
1130	3	76.68	0.15	84.81	77.81	-0.85	83.42	76.90	-0.45	84.33
1230	4	76.69	0.16	84.80	77.80	-0.86	83.43	76.89	-0.46	84.34
1348	5.30	76.68	0.15	84.81	77.77	-0.89	83.46	76.85	-0.50	84.38
1450	6.33	-	-	-	77.75	-0.91	83.48	76.84	-0.51	84.39
1615	7.75	-	-	-	77.75	-0.91	83.48	76.84	-0.51	84.39

NOTES:

Baseline Observations

bgs - Below ground surface

msl - Mean sea level

At 1440, started extracting groundwater from deep screened interval of NMW-11

**TABLE 6
OPERATION AND PERFORMANCE MONITORING
SVE PILOT TEST**

**NORTHROP GRUMMAN SYSTEMS CORPORATION
FORMER Y-12 FACILITY, ANAHEIM, CA**

Time	SVE Operation Parameters					TPE Well	Groundwater Monitoring Well Vacuum (in. H ₂ O)						
	Air Pressure (in. H ₂ O)	Air Flow (scfm)	Vacuum (in. Hg)	Inlet/Outlet Temperature (°F)	Blower Vacuum (in. Hg)		Casing Pressure (in. Hg)	NMW-2A	NMW-11	NMW-12		NMW-13	
									Deep	Shallow	Deep	Shallow	Deep
0750	-	-	-	-	-	-	-	-	-	-	-	-	-
0755	1.05	95.92	18.0	168/68	20.0	1.0	0.0	5.5	1.0	0.0	0.6	0.0	0.0
0805	1.00	94.83	18.0	185/69	20.5	1.0	0.3	5.9	1.2	0.0	0.7	0.0	0.0
0820	1.10	101.37	18.0	192/71	20.5	1.0	0.5	6.7	1.5	0.0	1.0	0.0	0.0
0835	1.15	103.55	18.5	195/73	21.5	1.0	0.7	6.8	1.7	0.0	1.1	0.0	0.0
0850	1.15	103.55	19.0	197/74	23.0	1.0	0.8	7.4	1.8	0.0	1.4	0.0	0.0
0920	1.25	109.00	17.5	198/77	22.5	1.0	1.1	8.4	2.2	0.0	1.5	0.0	0.0
0950	1.25	109.00	17.5	200/78	22.5	1.0	1.1	8.4	2.2	0.0	1.5	0.0	0.0
1000	INLET VACUUM DECREASED TO 10 IN. HG												
1015	2.10	141.70	10.0	194/82	15.5	1.0	1.7	14.2	3.2	2.9	2.0	0.0	0.0
1030	2.05	139.52	10.0	193/84	15.5	1.0	1.7	14.3	3.2	3.0	2.0	0.0	0.0
1045	2.05	139.52	10.0	193/86	16.0	0.0	1.9	14.4	3.3	3.1	2.1	0.0	0.0
1100	2.00	138.43	10.0	193/87	15.5	0.0	1.9	14.4	3.4	3.0	2.2	0.0	0.0
1130	2.05	139.52	10.5	195/88	16.0	0.0	2.0	14.3	3.4	3.1	2.3	0.0	0.0
1200	2.10	141.70	10.5	196/91	16.5	0.0	1.9	14.2	3.4	3.1	2.2	0.0	0.0
1215	INLET VACUUM INCREASED TO 12.5 IN. HG												
1230	1.80	130.80	12.5	200/91	17.5	0.0	1.8	12.6	3.1	2.5	2.1	0.0	0.0
1245	1.80	130.80	12.5	201/92	17.5	0.0	1.7	12.4	3	2.4	2	0.0	0.0
1315	1.80	130.80	12.5	201/92	17.0	0.0	1.7	12.3	2.9	2.1	1.9	0.0	0.0
1345	1.85	132.98	12.5	202/93	17.5	0.0	1.6	12.2	2.8	1.6	1.7	0.0	0.0
1415	1.85	132.98	13.0	202/92	17.5	0.0	1.3	11.7	2.5	1.3	1.5	0.0	0.0
1420	INLET VACUUM INCREASED TO 15 IN. HG												
1435	1.55	120.99	15.0	204/88	19.5	0.0	1.3	10.0	2.3	1.7	1.3	0.0	0.0
1450	1.60	123.17	15.0	205/88	20.0	0.0	1.2	9.9	2.2	1.1	1.3	0.0	0.0
1505	1.55	120.99	15.0	205/89	20.0	0.0	0.8	9.9	2.2	1.2	1.3	0.0	0.0
1520	1.50	119.90	15.0	205/88	20.0	0.0	1.2	9.8	2.2	1.3	1.2	0.0	0.0
1550	1.55	120.99	15.0	203/87	19.5	0.0	1.1	9.7	2.1	1.7	1.2	0.0	0.0
1620	1.50	120.99	15.0	203/88	20.5	0.0	0.9	9.5	1.9	0.8	1.1	0.0	0.0
1630	SVE SYSTEM SHUT DOWN												

NOTES:

Baseline Observations
SVE- Soil vapor extraction
TPE- Two-phase extraction
in. H₂O- Inches of water
scfm- Standard cubic feet per minute
in. Hg- Inches of mercury
°F- Degrees Fahrenheit
gpm- Gallons per minute

TABLE 7
FIELD VAPOR VOC CONCENTRATIONS (PID)
SVE PILOT TEST

NORTHROP GRUMMAN SYSTEMS CORPORATION
FORMER Y-12 FACILITY, ANAHEIM, CA

Time	Operation Period (hours)	PID Measurements (ppmv)	
		Before Carbon Vessels	After Carbon Vessels
0755	0.08	>9999	1.0
0800	0.17	>9999	0.0
0805	0.25	>9999	0.0
0810	0.33	>9999	0.0
0815	0.42	>9999	0.0
0820	0.50	>9999	0.0
0825	0.58	>9999	0.0
0830	0.67	>9999	0.0
0835	0.75	>9999	0.0
0840	0.83	>9999	0.0
0845	0.92	>9999	0.0
0850	1.00	>9999	0.0
0905	1.25	>9999	0.0
0920	1.50	>9999	0.0
0935	1.75	>9999	0.0
0950	2.00	>9999	0.0
1015	2.42	>9999	0.0
1030	2.67	>9999	0.2
1045	2.92	>9999	0.4
1100	3.17	>9999	0.5
1130	3.67	>9999	1.4
1200	4.17	>9999	0.5
1230	4.67	>9999	0.6
1245	4.92	>9999	0.8
1300	5.17	>9999	1.2
1315	5.42	>9999	1.7
1345	5.92	>9999	0.9
1415	6.42	>9999	1.9
1435	6.75	>9999	0.8
1450	7.00	>9999	0.9
1505	7.25	>9999	0.9
1520	7.50	>9999	0.8
1550	8.00	>9999	1.2
1620	8.50	>9999	1.2

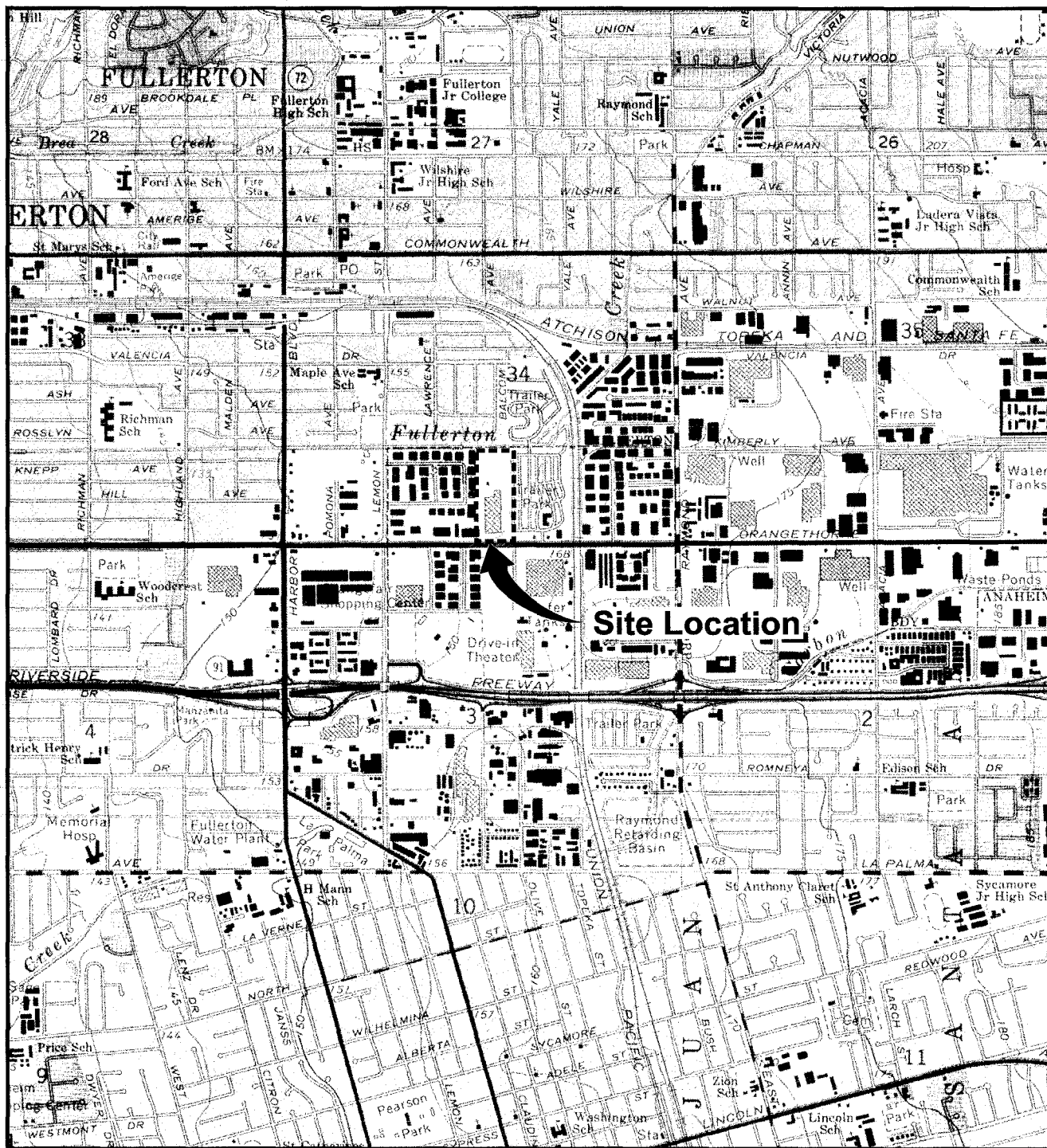
NOTES:

PID- Photoionization detector

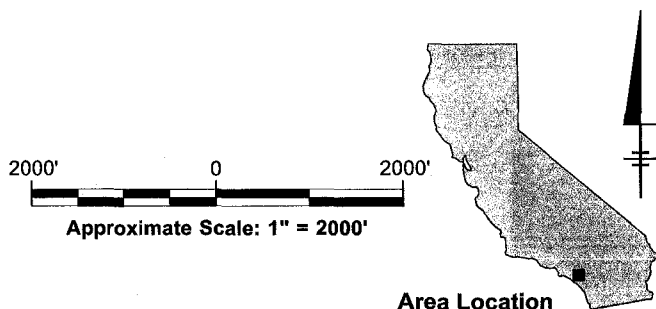
ppmv - Parts per million by volume

Figures

Figures



REFERENCE: BASE MAP USGS 7.5 MIN. QUAD., ANAHEIM, 1965, LA HABRA, CA., 1964, PHOTOREVISED 1981.



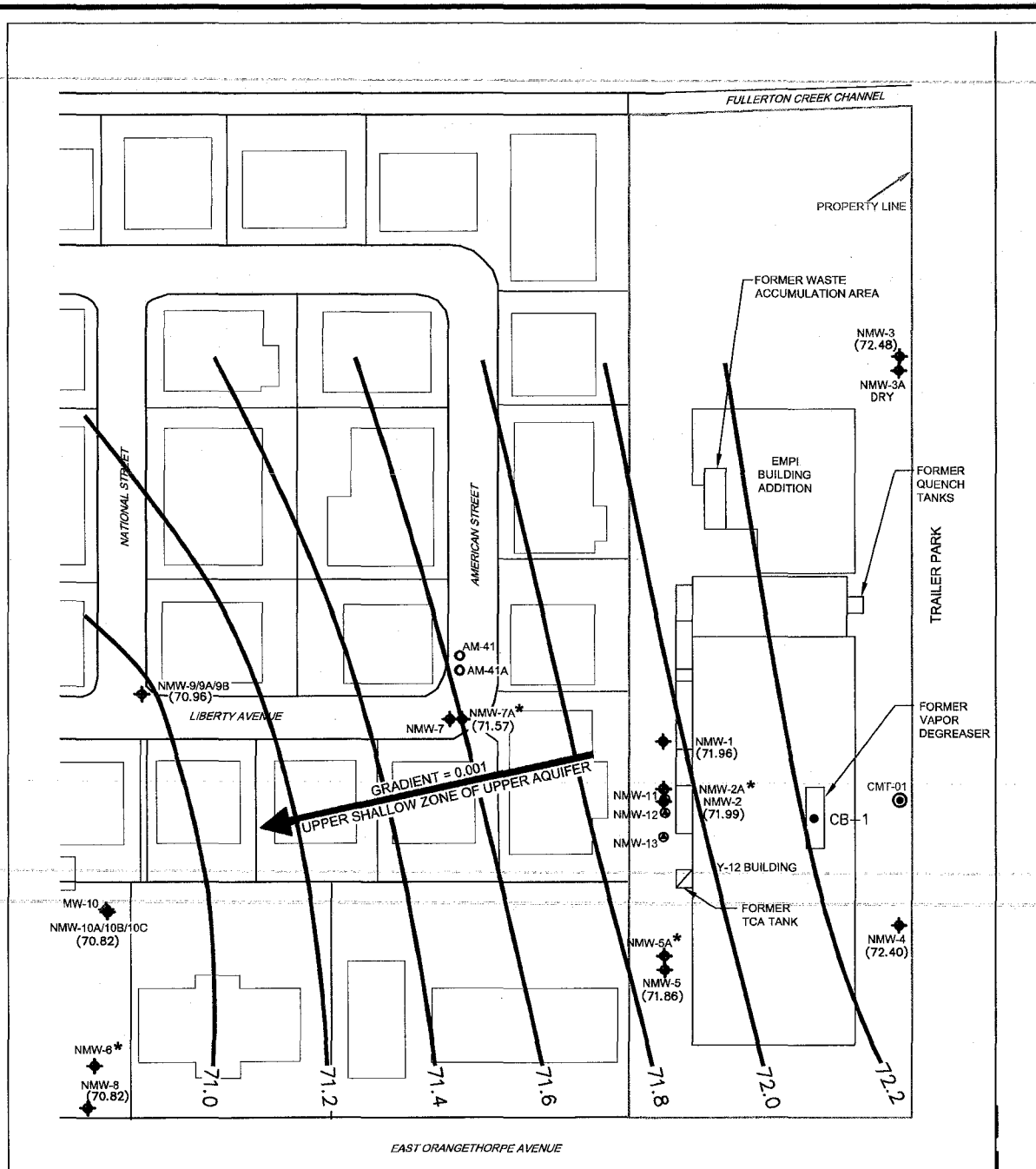
NORTHROP GRUMMAN CORPORATION
FORMER Y-12 FACILITY
ANAHEIM, CALIFORNIA
TPE/SVE PILOT TEST

FACILITY LOCATION MAP

ARCADIS BBLES
Infrastructure, environment, facilities

FIGURE
1

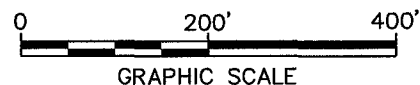
XREFS: IMAGES:



REFERENCE: FIGURE MODIFIED FROM ENVIRONMENTAL ENGINEERING AND CONTRACTING, INC., 2006, FIGURE 2 AND FROM URS, 2004.

LEGEND:

- ◆ MONITORING WELL CLUSTER
- (71.86) GROUNDWATER ELEVATION (IN FEET MSL)
- 71.4 — GROUNDWATER EQUIPOTENTIAL LINE $C1=0.2$ FEET, UPPER SHALLOW ZONE OF UPPER AQUIFER, MEASURED JAN. 9, 2006.
- * WELL IN PERCHED ZONE AND IS NOT USED FOR GROUNDWATER CONTOURS
- ⊙ CMT-01 LOCATION
- OCWD MONITORING WELL
- PILOT TEST WELL
- SOIL BORING



GRAPHIC SCALE

NORTHROP GRUMMAN CORPORATION
 FORMER Y-12 FACILITY
 ANAHEIM, CALIFORNIA
TPE/SVE PILOT TEST

MONITORING WELL LOCATION MAP

ARCADIS BBLES
 Infrastructure, environment, facilities

FIGURE
2

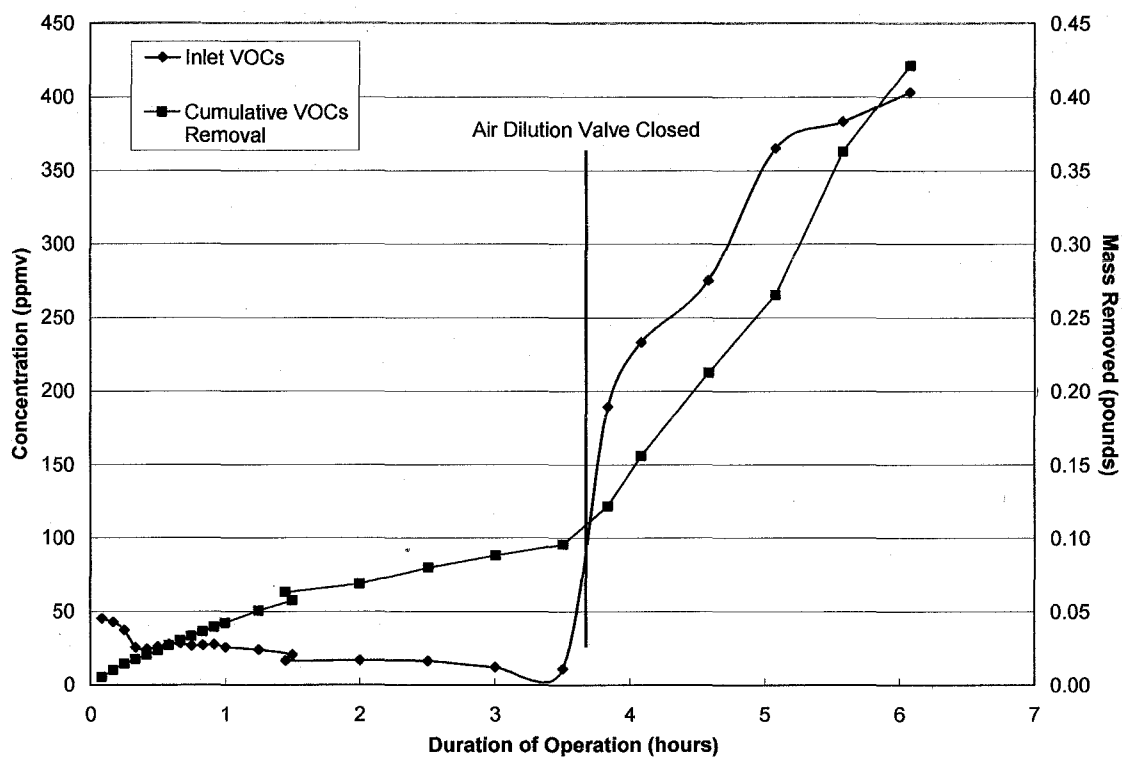


Figure 3
VOC Inlet Concentrations and Removal on Day 1
TPE Pilot Test

Northrop Grumman Systems Corporation
Former Y-12 Facility, Anaheim, CA

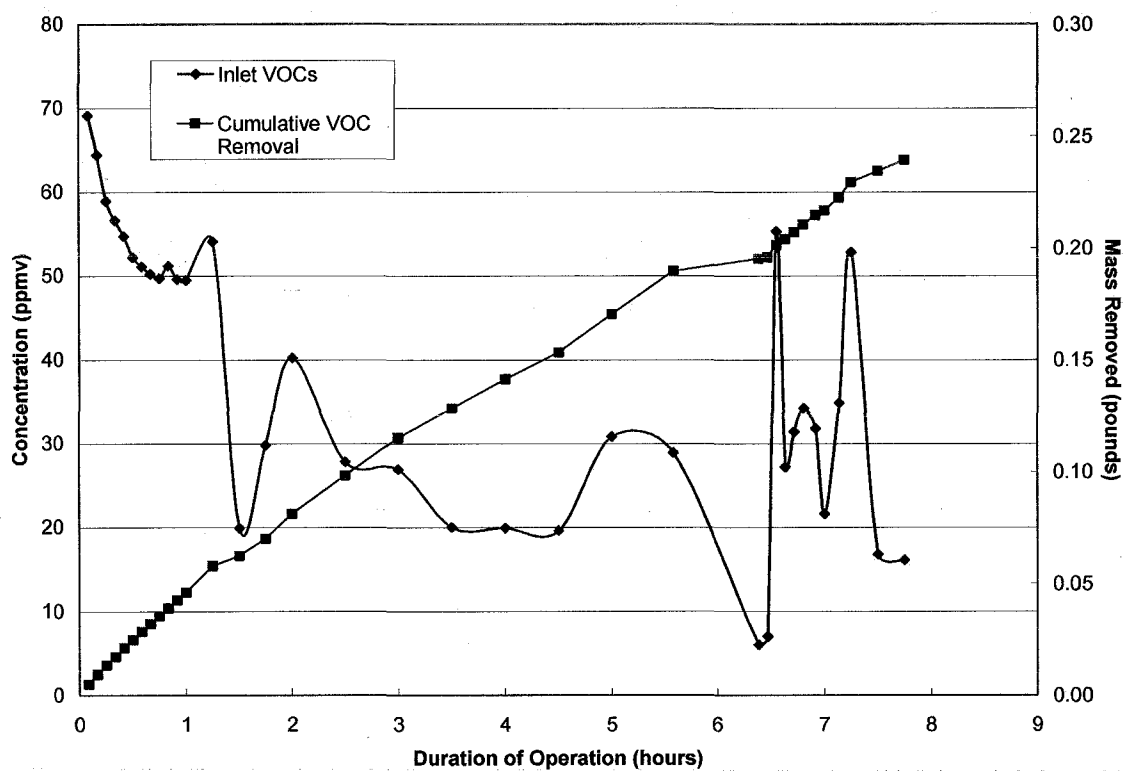


Figure 4
VOC Inlet Concentrations and Removal on Day 2
TPE Pilot Test

Northrop Grumman Systems Corporation
Former Y-12 Facility, Anaheim, CA

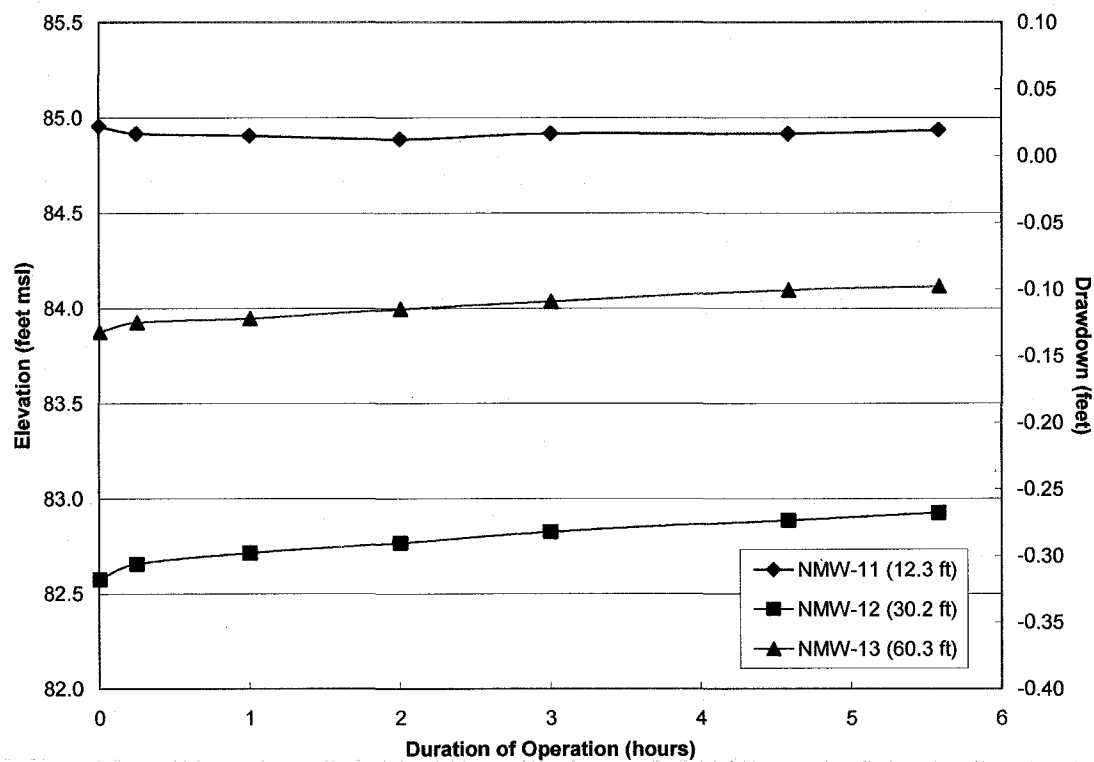


Figure 5
Groundwater Elevation and Drawdown in Monitoring Wells on Day 1
TPE Pilot Test

Northrop Grumman Systems Corporation
Former Y-12 Facility, Anaheim, CA

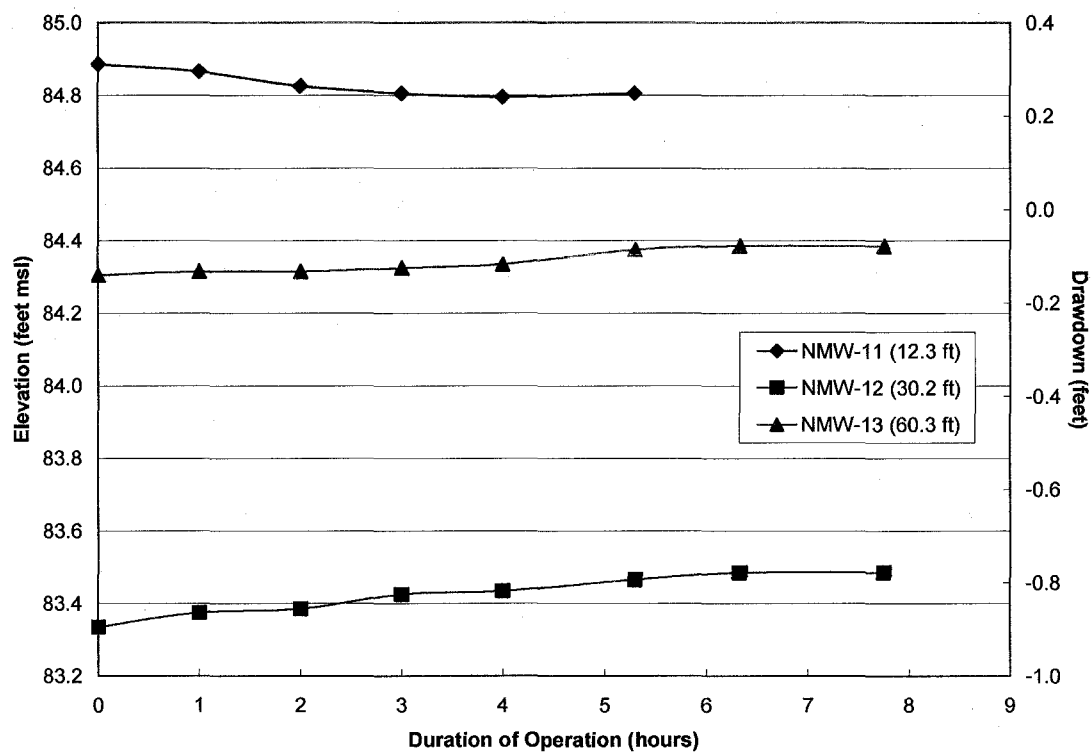


Figure 6
Groundwater Elevation and Drawdown in Monitoring Wells on Day 2
TPE Pilot Test

Northrop Grumman Systems Corporation
Former Y-12 Facility, Anaheim, CA

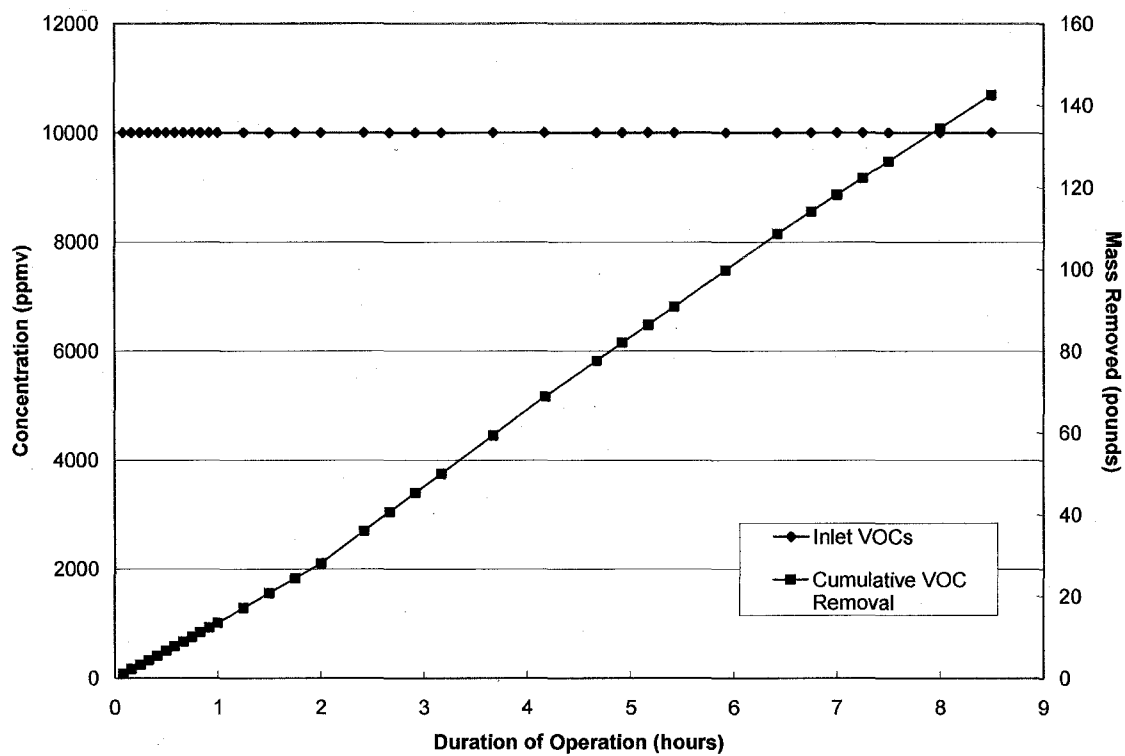


Figure 7
VOC Inlet Concentrations and Removal
SVE Pilot Test

Northrop Grumman Systems Corporation
Former Y-12 Facility, Anaheim, CA

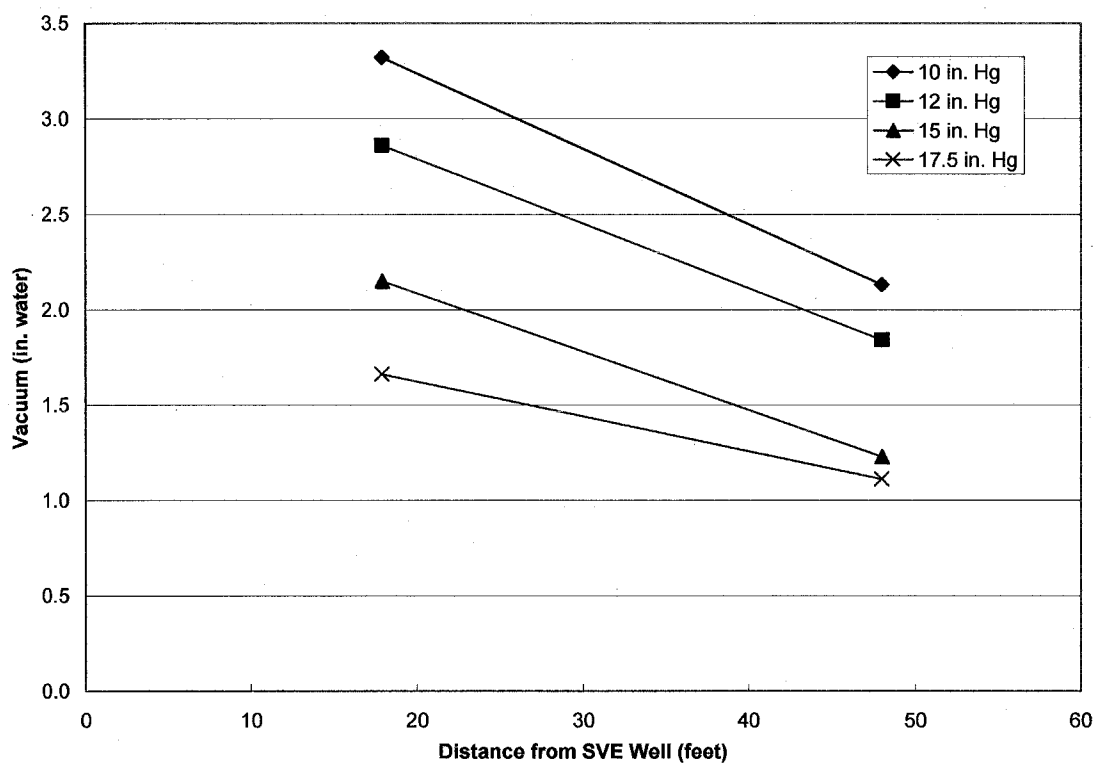


Figure 8
Effect of Inlet Vacuum & Well Distance on Vacuum Observed in Shallow Monitoring Wells
SVE Pilot Test

Northrop Grumman Systems Corporation
Former Y-12 Facility, Anaheim, CA

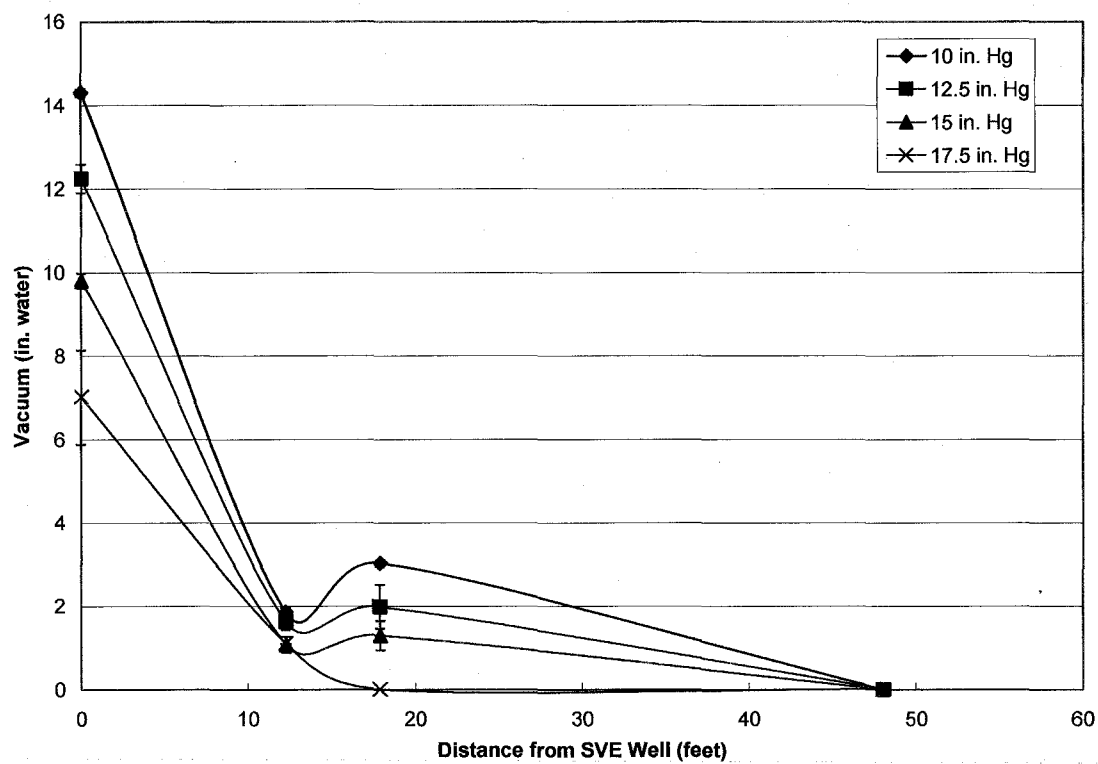


Figure 9
Effect of Inlet Vacuum & Well Distance on Vacuum Observed in Deep Monitoring Wells
SVE Pilot Test

Northrop Grumman Systems Corporation
Former Y-12 Facility, Anaheim, CA

Appendices

ARCADIS BBLES

Appendices


Appendix A

Appendix A

Well Construction Logs

Date Start/Finish: 10/9/2006-10/9/2006 Drilling Company: Cascade Drilling, Inc. Driller's Name: Orville Waters Drilling Method: HSA Bit Size: 6" OD Auger Size: 8" OD Rig Type: CME-85 Sampling Method: 2" ID Split Spoon	Northing: NM Easting: NM Casing Elevation: NM Borehole Depth: 95' bgs Surface Elevation: NM Description By: Maher Zein	Well/Boring ID: NMW-11 Client: Northrop Grumman Former Y-12 Facility Anaheim, CA Location: 301 E. Orangethorpe Ave. Anaheim, CA
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DEPTH	Sample Run Number	Interval Sampled	Recovery (feet)	PID Headspace (ppm)	Blow Counts	N-value	USCS Code	Geologic Column	Stratigraphic Description	Well/Boring Construction
0	NA	NA	NA	NA	NA	NA			Concrete surface, hand auger to 6'	Flush-mounted 12" Traffic-rated well vault
5										Class A Concrete Seal
10										2" Diam, Sch 40 PVC Casing
15										Grout: Portland with 5% bentonite
20				1.3			CL		CLAY (CL), dark grayish brown (2.5Y 4/2), moist, 20% silt, low plasticity	
25										
30										
35										#2/12 Sand (28' - 72')
40				2.8			SP-SM		SAND with Silt (SP-SM), olive brown (2.5Y 4/4), dry, med.-grained sand, trace gravel	2" Diam, 0.010 Slot Screen, Sch 40 PVC (30' - 70')
45										



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Remarks: bgs = below ground surface
 ID = inside diameter
 OD = outside diameter
 NM = Not Measured

SAA = Same as above
 med. = medium
 HSA = Hollow Stem Auger
 NA = Not Applicable/Available

Groundwater encountered during drilling at 85' bgs
 Note: Cuttings were described at 20-foot intervals. See nearby wells NMW-12 and NMW-13 for complete lithologic descriptions.

Date Start/Finish: 10/9/2006-10/9/2006
Drilling Company: Cascade Drilling, Inc.
Driller's Name: Orville Waters
Drilling Method: HSA
Bit Size: 6" OD
Auger Size: 8" OD
Rig Type: CME-85
Sampling Method: 2" ID Split Spoon

Northing: NM
Easting: NM
Casing Elevation: NM
Borehole Depth: 95' bgs
Surface Elevation: NM
Description By: Maher Zein

Well/Boring ID: NMW-11
Client: Northrop Grumman
 Former Y-12 Facility
 Anaheim, CA
Location: 301 E. Orangethorpe Ave.
 Anaheim, CA

DEPTH	Sample Run Number	Interval Sampled	Recovery (feet)	PID Headspace (ppm)	Blow Counts	N-value	USCS Code	Geologic Column	Stratigraphic Description	Well/Boring Construction
50	NA	NA	NA	NA	NA	NA				
55										
60				7.1			SP-SC		SAND with Silt (SP-SM), olive brown (2.5Y 4/3), moist, med.-grained sand, trace gravel	#2/12 Sand (28' - 72')
65										2" Diam, Sch 40 PVC Casing
70										
75										Bentonite Seal
80				2.7			SP-SM		SAND with Clay (SP-SC), dark olive brown (2.5Y 3/3), moist, med.- to coarse-grained sand, trace gravel	
85										2" Diam, 0.010 Slot Screen, Sch 40 PVC (80' - 95')
90										
95									Terminate borehole at 95' bgs. Construct groundwater monitoring well.	

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Remarks: bgs = below ground surface SAA = Same as above
 ID = inside diameter med. = medium
 OD = outside diameter HSA = Hollow Stem Auger
 NM = Not Measured NA = Not Applicable/Available

Groundwater encountered during drilling at 85' bgs
 Note: Cuttings were described at 20-foot intervals. See nearby wells NMW-12 and NMW-13 for complete lithologic descriptions.

Date Start/Finish: 10/5/2006-10/5/2006 Drilling Company: Cascade Drilling, Inc. Driller's Name: Todd Mecham Drilling Method: Sonic Bit Size: 6" OD Auger Size: NA Rig Type: Sonic 50K Sampling Method: NA	Northing: NM Easting: NM Casing Elevation: NM Borehole Depth: 95' bgs Surface Elevation: NM Description By: Colin Enssle	Well/Boring ID: NMW-12 Client: Northrop Grumman Former Y-12 Facility Anaheim, CA Location: 301 E. Orangethorpe Ave. Anaheim, CA
--	---	---

DEPTH	Sample Run Number	Interval Sampled	Recovery (feet)	PID Headspace (ppm)	Blow Counts	N-value	USCS Code	Geologic Column	Stratigraphic Description	Well/Boring Construction
0	NA	NA			NA	NA			Road base top 12", hand auger to approximately 7"	Flush-mounted 12" Traffic-rated well vault
5			30.5				SP-SM		SAND with Silt (SP-SM), dark brown, loose, moist, 10% silt, very fine- to med.-grained sand, 10% coarse-grained sand, trace gravel	Class A Concrete Seal
			27.9							
			53.8							
			75.6				ML		Sandy SILT (ML), dark brown, med. dense, moist, 10% clay, very fine- to fine-grained sand, trace med- to coarse-grained sand	2" Diam. Sch 40 PVC Casing
			85.5							
			96.7						Increasing clay (25%)	
			103						Decreasing clay (10%)	
10			161				SW		SAND (SW), light brown, loose, moist, trace fine silt, fine- to coarse-grained sand, fine gravel	
			48.1							
			79.1							
			77.4				SM		Silty SAND (SM), dark brown, med. dense, moist, 25% silt, very fine- to fine-grained sand, no odor	
			242							
			27.1							
15			51.2							
			79.3							
			105						Becomes lighter brown, 10% clay, increasing med-grained sand	
			62.7							
20			202						Becomes trace clay, very fine- to med.-grained sand with 10% coarse-grained sand	
			103							
			213							
			304						Silty SAND (SM), light brown, loose, moist, very fine- to med.-grained sand, trace coarse-grained sand, no odor	
			697							
			74.3				ML		Increasing coarse-grained sand (25%), fine gravel (10%)	
25			292							
			141						Sandy SILT (ML), brown, med. dense, moist, trace clay, very fine- to fine-grained sand	
			311				SP		SAND (SP), light brown, loose, moist, trace silt, fine- to med.-grained sand, no odor	
			28							
			112							
30			42.5							
			68.1							
			14.1							
			168							
			79.1							
35			156						Increasing moist to dry, coarse-grained sand (20%)	
			864							
			362						Becomes very loose, moist, increasing very fine- to fine-grained sand (50%), no coarse-grained sand	
			166				SC			
40			74						Clayey SAND (SC), brown with mottled dark brown, dense, moist, 50% clay, 25% silt, very fine- to fine-grained sand	
			162							
			135				SP		Becomes very loose, trace silt	
			162							
			112						SAND (SP), light brown with lenses of mottled dark brown Sandy SILT, loose, moist, trace silt, very fine- to fine-grained sand, no odor. Becomes fine- to med.-grained sand.	
45			526							
			324						Increasing moist to dry, very fine- to fine-grained sand	

 an ARCADIS company	Remarks: bgs = below ground surface ID = inside diameter OD = outside diameter NM = Not Measured	SAA = Same as above med. = medium HSA = Hollow Stem Auger NA = Not Applicable/Available
	Groundwater encountered during drilling at 83.34' bgs (shallow)	

Date Start/Finish: 10/5/2006-10/5/2006 Drilling Company: Cascade Drilling, Inc. Driller's Name: Todd Mecham Drilling Method: Sonic Bit Size: 6" OD Auger Size: NA Rig Type: Sonic 50K Sampling Method: NA	Northing: NM Easting: NM Casing Elevation: NM Borehole Depth: 95' bgs Surface Elevation: NM Description By: Colin Enssle	Well/Boring ID: NMW-12 Client: Northrop Grumman Former Y-12 Facility Anaheim, CA Location: 301 E. Orangethorpe Ave. Anaheim, CA
--	---	---

DEPTH	Sample Run Number	Interval Sampled	Recovery (feet)	PID Headspace (ppm)	Blow Counts	N-value	USCS Code	Geologic Column	Stratigraphic Description	Well/Boring Construction
50	NA	NA	145	NA	NA				Increasing coarse-grained sand	
			565						Increasing very fine- to fine-grained sand, micaceous	
			813							
			517				ML		Sandy SILT (ML), dark brown with red-brown mottling, med. dense, moist, trace clay, very fine- to fine-grained sand, no odor	
			1084							
			145				SP		SAND (SP), light brown, very loose, moist, trace silt, very fine- to fine-grained sand, trace coarse-grained sand and gravel	
55			328							
			127						SAA, becomes drier, no coarse-grained sand, no gravel	
			464				SM		Silty SAND (SM), olive, loose, moist, 20% silt, very fine- to fine-grained sand, micaceous, no odor	
			473							
			126						SAA, med. dense, 50% silt	
60			820							
			1563						SAA, dark brown to dark gray, dense, 20% clay	
			411							
			393						Silty SAND (SM), olive gray, loose, moist, very fine- to med.-grained sand, micaceous, no odor	
			540							
			203				SP		SAND (SP), light olive brown, loose, moist, trace silt, fine- to med.-grained sand, no odor	
65			144							
			87				CL		Silty CLAY (CL), dark brown with gray mottling, firm, moist, trace fine- to med.-grained sand, no odor	
			141							
			491				SM		Silty SAND (SM), olive brown, loose, moist, 20% silt, very fine- to med.-grained sand, no odor	
70			751							
			482				ML		Sandy SILT (ML), dark brown, med. dense, moist, very fine- to fine-grained sand, no odor	
			1445							
			88						SAA, dense, increasing med.-grained sand, trace coarse-grained sand	
75			239							
			136				CL		Silty CLAY (CL), dark brown with gray mottling, med. dense, moist, trace med.- and coarse-grained sand	
			94						SAA, less silt, dense clay	
			45							
			74						Sandy CLAY (CL), mottled dark gray and brown, firm, moist, 20% silt, very fine- to med.-grained sand, trace coarse-grained sand and fine gravel, no odor	
80			226				ML			
			383						Sandy SILT (ML), dark brown, firm, moist, 10% clay, very fine- to fine-grained sand, no odor	
			770				CL		Sandy CLAY with Silt (CL), dark brown with dark gray mottling, dense, moist, fine- to med.-grained sand, trace coarse-grained sand, fine gravel	
			60							
			118							
85			126							
			83.4							
			30.2							
			87.4							
			38.7							
90			56.3				ML		Sandy SILT (ML), dark brown, firm, moist, 30% clay, very fine- to med.-grained sand, 10% coarse-grained sand, trace fine gravel, no odor	
			67.8						SAA, no trace fine gravel	
			83.5							
			48.4							
95			44.7							
									Terminate borehole at 95' bgs. Construct groundwater monitoring well.	

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Remarks: bgs = below ground surface
 ID = inside diameter
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 NM = Not Measured
 SAA = Same as above
 med. = medium
 HSA = Hollow Stem Auger
 NA = Not Applicable/Available

Groundwater encountered during drilling at 83.34' bgs (shallow)

Date Start/Finish: 10/3/2006-10/4/2006 Drilling Company: Cascade Drilling, Inc. Driller's Name: Todd Mecham Drilling Method: Sonic Bit Size: 6" OD Auger Size: NA Rig Type: Sonic 50K Sampling Method: NA	Northing: NM Easting: NM Casing Elevation: NM Borehole Depth: 95' bgs Surface Elevation: NM Description By: Colin Enssle	Well/Boring ID: NMW-13 Client: Northrop Grumman Former Y-12 Facility Anaheim, CA Location: 301 E. Orangethorpe Ave. Anaheim, CA
--	---	---

DEPTH	Sample Run Number	Interval Sampled	Recovery (feet)	PID Headspace (ppm)	Blow Counts	N-value	USCS Code	Geologic Column	Stratigraphic Description	Well/Boring Construction
0	NA	NA			NA	NA			Road base ~1'. Hand auger to ~7'.	Flush-mounted 12" Traffic-rated well vault
5			4.4 10.6 14.9 10.1 18.5 21.3 14.0 38.9 26.2 31.7 14.1 8.5 14.1 10.6 32.0 42.2 51.4 27.6 55.4 37.2 83.8 29.7 67.1 38.6 56.4 21.3 61.8 26.1 12.9 43.7 55.9 65.0 201.3 169.2 270 68.3 164.6 8.9 45.8 6.5 13.5 25.4 41.7 28.7					SP	SAND (SP), dark brown, very loose, dry, trace silt, fine- to med.-grained sand, trace coarse gravel, subrounded, little micaceous Becomes loose, slightly moist, little silt	Class A Concrete Seal 2" Diam, Sch 40 PVC Casing
10							SP-SM		SAND with Silt (SP-SM), dark brown, med. dense, some clay, little fine to med. gravel SAA, no clay, trace fine gravel SAA, increasing silt and sand, loose	
15							ML		SILT (ML), dark brown, slightly moist, firm, little sand SAA, darker brown, trace gravel	
							SM		Silty SAND (SM), dark brown with trace olive gray, med. dense, moist, fine- to med.-grained sand, trace coarse gravel, little micaceous	Grout: Portland with 5% bentonite
20							SP		SAND (SP), brown, loose, moist, trace clay and silt, very fine- to fine-grained sand SAA, increasing silt and very fine-grained sand SAA, decreasing silt and very fine-grained sand	
25							SM		SAND (SP), brown, very loose, dark brown clay lenses, very fine- to med.-grained sand, subrounded Silty SAND (SM), dark brown, loose, little clay, very fine- to med.-grained sand, trace fine gravel	
30							SP		SAND (SP), light brown, loose, med.-grained subrounded sand, trace fine gravel SAA, little fine-grained sands	
35									SAA, increasing very fine- to fine-grained sand SAA, with mottled brown to dark brown lenses of clay and silt	#2/12 Sand (28' - 72')
40									SAND (SP), light brown, very loose, moist, fine- to med.-grained sand, subrounded SAA, med.-grained sand, trace fine gravel SAA trace med. gravel, no odor, no cementation	2" Diam, 0.010 Slot Screen, Sch 40 PVC (30' - 70')
45									SAND (SP), light brown, loose, dry, little, silt, very fine- to fine-grained sand in 5% cemented fraction	

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Remarks: bgs = below ground surface
 ID = inside diameter
 OD = outside diameter
 NM = Not Measured
 SAA = Same as above
 med. = medium
 HSA = Hollow Stem Auger
 NA = Not Applicable/Available

Groundwater encountered during drilling at 69.39' bgs (shallow), 77.58' bgs (deep)

Date Start/Finish: 10/3/2006-10/4/2006
Drilling Company: Cascade Drilling, Inc.
Driller's Name: Todd Mecham
Drilling Method: Sonic
Bit Size: 6" OD
Auger Size: NA
Rig Type: Sonic 50K
Sampling Method: NA

Northing: NM
Easting: NM
Casing Elevation: NM
Borehole Depth: 95' bgs
Surface Elevation: NM
Description By: Colin Enssle

Well/Boring ID: NMW-13
Client: Northrop Grumman
 Former Y-12 Facility
 Anaheim, CA
Location: 301 E. Orangethorpe Ave.
 Anaheim, CA

DEPTH	Sample Run Number	Interval Sampled	Recovery (feet)	PID Headspace (ppm)	Blow Counts	N-value	USCS Code	Geologic Column	Stratigraphic Description	Well/Boring Construction
50	NA	NA	86.0	NA	NA	NA	ML		Sandy SILT (ML), olive gray with brown mottling, firm, moist, clay, very fine- to fine-grained sand, no odor	
			57.9							
			67.3							
			31.0				SP		SAND (SP), brownish red, loose, moist, fine- to med.-grained sand, trace silt	
			178.0							
			51.1						SAND (SP), light brown, loose, moist, fine- to med.-grained sand, no odor, 5% cemented fraction	
			89.7						SAA, becomes brown with 10% brown clay lenses throughout	
55			89.9							
			199							
			264				SP-SM		SAND with Silt (SP-SM), dark brown, med. dense, moist, very fine- to fine-grained sand, crumbly, no odor	
			173						SAA, becomes light brown	
			80.1				SP		SAND (SP), med. dense, trace clay, little silt, very fine- to fine-grained sand, subrounded, no odor	
60			90.8							
			77.6						SAND (SP), light brown, loose, moist, fine- to med.-grained sand	
			78.4				SP-SM		SAND with Silt (SP-SM), dark brown, med. dense, moist, 25% clay, very fine- to fine-grained sand, trace med.-grained sand	
			74.0							
			100							
65			54.6							
			180				SP		SAND (SP), brownish red, loose, moist, trace silt, fine- to med.-grained sand	
			47.3							
			124						SAA, gray mottling, med. dense, fine-grained sand	
			71				SP-SC		SAND with Clay (SP-SC), light brown, loose, moist, 10% clay, fine- to med.-grained sand, little fine gravel	
70			132							
			73.4				SP		SAND (SP), dark brown, med. dense, moist, fine- to med.-grained sand, trace fine gravel	
			83.8							
			22.1				SP-SM		SAND with Silt (SP-SM), loose, fine-grained sand, trace fine gravel	
			12.1						SAA, dark brown, 20% clay, very fine-grained sand, trace coarse-grained sand	
75			23.4							
			23.9				CL		Sandy CLAY (CL), dark brown, firm, moist, very fine- to med.-grained sand	
			34.4							
			100				SP		SAND (SP), light brown to red, loose, moist, trace clay, fine- to med.-grained sand	
80			25.9							
			41.4						SAND (SP), olive gray with brown mottling, loose, moist, trace clay and silt lenses, fine- to med.-grained sand, little coarse-grained sand, no odor	
			33.2							
			99.7							
85										
							CL		Sandy CLAY (CL), gray, firm, moist, fine- to med.-grained sand, trace coarse-grained sand, no odor	
									SAA, becomes dark brown	
90										
95									Terminate borehole at 95' bgs. Construct groundwater monitoring well.	



Remarks: bgs = below ground surface
 ID = inside diameter
 OD = outside diameter
 NM = Not Measured
 SAA = Same as above
 med. = medium
 HSA = Hollow Stem Auger
 NA = Not Applicable/Available

Groundwater encountered during drilling at 69.39' bgs (shallow), 77.58' bgs (deep)

Appendix B

Appendix B

Well Permits

CITY OF ANAHEIM
PUBLIC UTILITIES DEPARTMENT ENVIRONMENTAL SERVICES DIVISION
 201 S. Anaheim Blvd., Suite 601, Anaheim, CA 92805
 714/765-4112, Fax: 714/765-4135

WELL PERMIT

TYPE OF PERMIT: ☒ CONSTRUCTION ☐ DESTRUCTION

DATE: Aug 28, 2006

LOCATION OF WELL(S): Former Y-12 Facility, Northrop Grumman Corp., 301 Orangethorpe Ave., Anaheim, CA 92801-1032

APPLICANT'S NAME:
Norbert Schulz

WELL OWNER NAME: (Individual's Name)
Michael Martin

COMPANY:
BBL, Inc.

COMPANY: (if applicable)
Northrop Grumman Corporation

ADDRESS:
4445 Eastgate Mall, Suite 200

ADDRESS:
One Hornet Way

CITY:
San Diego

CITY:
El Segundo

STATE: CA ZIP: 92121

STATE: CA ZIP: 90245

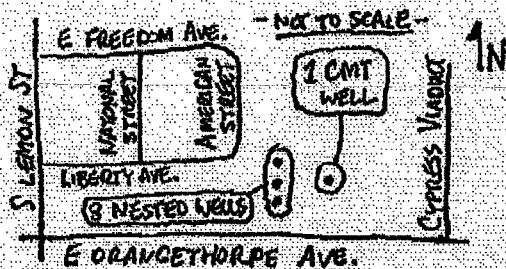
PHONE:
858.812.2037

PHONE:
301.331.1766

OPEN UST CLEANUP CASE? ☐ YES ☒ NO

PROPOSED WELL(S) 4 wells total: 3 nested monitoring, 1 CMT

LOCATION MAP (Submit 2 copies of site plans)
Office use only



Well ID	Type	DIAM (INCHES)	DEPTH (FEET)	SCREEN INTERVALS
NMW-11 A,B	Monitoring	8 inches	95 ft bgs	30-70', 80-95'
NMW-12 A,B	Monitoring	8 inches	95 ft bgs	30-70', 80-95'
NMW-13 A,B	Monitoring	8 inches	95 ft bgs	30-70', 80-95'
CMT-01 A,B,C,D	CMT	6 inches	200 ft bgs	85-95', 120-130', 150-160', 190-200'

LENGTH OF TIME WELL TO REMAIN IN USE: 2 yrs.

APPLICANT SHALL NOTIFY THE CITY OF ANAHEIM AT LEAST 48 HOURS PRIOR TO CONDUCTING FIELD ACTIVITIES AT 714/765-4591

WELL FEE \$100 per permit, \$75 per well (up to 10 wells per permit)

I HEREBY AGREE TO COMPLY WITH ALL ORDINANCES, RULES AND REGULATIONS OF THE CITY OF ANAHEIM AND THE STATE OF CALIFORNIA PERTAINING TO WELL CONSTRUCTION AND DESTRUCTION. I ATTEST THAT I AM AUTHORIZED TO SIGN ON BEHALF OF THE PROPERTY OWNER AND/OR WELL OWNER.

TOTAL FEE DUE $(4 * \$75) + \$100 = \$400$

PAYMENT RECEIVED AND PERMIT AUTHORIZED:

APPLICANT'S SIGNATURE

DATE

AUTHORIZING AGENT

DATE

UNLESS SIGNED AND DATED BY THE AUTHORIZING AGENT, THE WELL PERMIT IS NOT VALID.

INSPECTED BY

DATE

WELL PERMIT NO. 1085

Appendix C

CCVOCBWA

Appendix C

AQMD Permit



AQMD

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT
21865 East Copley Drive, Diamond Bar, CA 91765**PERMIT TO CONSTRUCT/OPERATE**page 1
Permit No.
R-F45563
A/N 390569

This initial permit must be renewed ANNUALLY unless the equipment is moved, or changes ownership.
If the billing for annual renewal fee (Rule 301.f) is not received by the expiration date, contact the District.

LEGAL OWNER
OR OPERATOR:SLABY SALES COMPANY
P O BOX 903
BORREGO SPRINGS, CA 92004

ID 121810

Equipment Location: VARIOUS LOCATIONS

Equipment Description:

UNDERGROUND CONTAMINATED SOIL VAPOR EXTRACTION AND CONTROL SYSTEM CONSISTING OF:

1. VAPOR EXTRACTION WELLS.
2. SEPARATOR, VAPOR/LIQUID.
3. BLOWER, MAXIMUM FLOW RATE OF 250 SCFM.
4. TWO CARBON ADSORBERS, CANNISTER-TYPE, IN SERIES, EACH WITH AT LEAST 1000 POUNDS OF ACTIVATED CARBON.

Conditions:

- 1) OPERATION OF THIS EQUIPMENT SHALL BE CONDUCTED IN ACCORDANCE WITH ALL DATA AND SPECIFICATIONS SUBMITTED WITH THE APPLICATION UNDER WHICH THIS PERMIT IS ISSUED UNLESS OTHERWISE NOTED BELOW.
- 2) THIS EQUIPMENT SHALL BE PROPERLY MAINTAINED AND KEPT IN GOOD OPERATING CONDITION AT ALL TIMES.
- 3) IDENTIFICATION TAGS OR NAMEPLATES SHALL BE DISPLAYED ON THE EQUIPMENT TO SHOW MANUFACTURER MODEL NO. AND SERIAL NO. THE TAGS OR NAMEPLATES SHALL BE ISSUED BY THE MANUFACTURER AND SHALL BE AFFIXED TO THE EQUIPMENT IN A PERMANENT AND CONSPICUOUS LOCATION.
- 4) CURRENT CONTACT PERSON'S NAME, COMPANY AND PHONE NUMBER SHALL BE DISPLAYED IN A PERMANENT AND CONSPICUOUS LOCATION.

ORIGINAL



SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT
21865 East Copley Drive, Diamond Bar, CA 91765

PERMIT TO CONSTRUCT/OPERATE

page 2
Permit No.
R-F45563
A/N 390569

CONTINUATION OF PERMIT TO CONSTRUCT/OPERATE

- 5) FIVE DAYS AFTER THE EQUIPMENT IS PLACED INTO OPERATION AT A NEW SITE, THE AQMD SHALL BE NOTIFIED VIA PHONE AT 1-877-810-6995 OF THE FOLLOWING:
- A. THE PERMIT NUMBER OF THE EQUIPMENT.
 - B. NAME AND PHONE NUMBER OF THE CONTACT PERSON.
 - C. THE LOCATION WHERE THE EQUIPMENT WILL BE OPERATED.
 - D. THE ESTIMATED TIME THE EQUIPMENT WILL BE OPERATED AT THE LOCATION.
 - E. DESCRIPTION OF THE PROJECT.
 - F. IF LESS THAN 1/4 MILE, THE DISTANCE TO THE NEAREST SENSITIVE RECEPTOR (LONG TERM HEALTH CARE FACILITY, REHABILITATION CENTERS, CONVALESCENT CENTERS, RETIREMENT HOMES, RESIDENCES, SCHOOLS GRADES K THRU 12, PLAYGROUNDS, CHILD CARE CENTERS AND ATHLETIC FACILITIES).
- 6) THIS EQUIPMENT SHALL NOT BE OPERATED AT THE SAME LOCATION MORE THAN TWELVE CONSECUTIVE MONTHS. ANY EQUIPMENT THAT REPLACES THE EQUIPMENT AT A SITE AND IS INTENDED TO PERFORM THE SAME FUNCTION AS THE EQUIPMENT BEING REPLACED SHALL BE INCLUDED IN CALCULATING THE TIME PERIOD.
- 7) UPON COMPLETION, ANY VAPOR EXTRACTION WELLS AND DUCTS SHALL BE CAPPED TO PREVENT VAPORS FROM VENTING TO THE ATMOSPHERE. VAPORS SHALL NOT BE EXTRACTED FROM THE SOIL UNLESS THEY ARE VENTED TO THE VAPOR CONTROL SYSTEM, WITH NO DETECTABLE LEAK BETWEEN THE OUTLET OF THE BLOWER AND THE OUTLET OF THE VAPOR CONTROL SYSTEM.
- 8) A FLOW INDICATOR SHALL BE INSTALLED AND MAINTAINED AT THE INLET TO THE VAPOR CONTROL SYSTEM TO INDICATE THE FLOW RATE IN STANDARD CUBIC FEET PER MINUTE (SCFM). IN CASE A PRESSURE SENSOR DEVICE IS USED IN PLACE OF THE FLOW INDICATOR, A CONVERSION CHART SHALL BE POSTED ON THE EQUIPMENT TO INDICATE THE FLOW RATE (IN CFM) CORRESPONDING TO THE PRESSURE READING.
- 9) THE TOTAL FLOW RATE AT THE INLET TO THE VAPOR CONTROL SYSTEM SHALL NOT EXCEED 250 SCFM.
- 10) THE TOTAL INLET CONCENTRATION SHALL NOT EXCEED 10,000 PPMV AS HEXANE.

ORIGINAL



SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT
21865 East Copley Drive, Diamond Bar, CA 91765

PERMIT TO CONSTRUCT/OPERATE

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CONTINUATION OF PERMIT TO CONSTRUCT/OPERATE

- 11) THE VOLATILE ORGANIC COMPOUNDS (VOC) CONCENTRATIONS AT THE INLETS TO THE PRIMARY ADSORBER AND THE FINAL ADSORBER AND THE OUTLET FROM THE FINAL ADSORBER SHALL BE MEASURED ON THE FOLLOWING FREQUENCY:

DURING FIRST 48 HOURS OF OPERATION:

TWO CONSECUTIVE INLET
CONCENTRATIONS (PPMV)

TIME INTERVAL (HOURS) UNTIL
NEXT MEASUREMENT

>5000

2 HOURS

5000 - 2501

4 HOURS

2500 - 1251

8 HOURS

1250 - 601

12 HOURS

<600

24 HOURS

AFTER THE FIRST 48 HOURS OF OPERATION AND UNTIL THE END OF THE FIRST TWO WEEKS OF OPERATION, MEASUREMENTS SHALL BE TAKEN DAILY. AFTER THE FIRST TWO WEEKS OF OPERATION, MEASUREMENTS SHALL BE TAKEN ONCE PER WEEK.

CONCENTRATIONS SHALL BE MONITORED USING A PID WHEN TREATING CHLORINATED-CONTAMINATED SITES, A FID WHEN TREATING PETROLEUM HYDROCARBON-CONTAMINATED SITES OR AN AQMD APPROVED ORGANIC VAPOR ANALYZER (OVA) CALIBRATED IN PARTS PER MILLION BY VOLUME (PPMV) OF HEXANE (IF ANOTHER CALIBRATING AGENT IS USED IT SHALL BE CORRELATED TO AND EXPRESSED AS HEXANE).

- 12) A SAMPLE OF THE VAPOR (INCLUDING DILUTION AIR) IN THE INLET TO THE PRIMARY ADSORBER AND THE OUTLET FROM THE FINAL ADSORBER SHALL BE COLLECTED FOR LABORATORY ANALYSIS USING APPROVED METHODS (IN CASES OF PROJECTS WHICH ARE COMPLETED WITHIN FIVE DAYS, CALORIMETRIC TUBES SHALL BE USED) IN THE FIRST 48 HOURS OF OPERATION AND THEN ONCE A MONTH THEREAFTER. SAMPLES SHALL BE COLLECTED CONCURRENTLY WITH VOC MONITORING. SAMPLES SHALL BE ANALYZED FOR TOTAL VOC (EXCEPT FOR PROJECTS COMPLETED WITHIN 5 DAYS) AND FOR EACH OF THE COMPOUNDS IDENTIFIED IN CONDITION 14 WITH THE EXCEPTION OF COMPOUNDS ANALYZED IN THE SITE ASSESSMENT AND FOUND TO BE NON-DETECTABLE.
- 13) THE VOC CONCENTRATION MEASURED AT THE OUTLET OF THE VAPOR CONTROL SYSTEM SHALL NOT EXCEED 10 PPMV AS HEXANE.
- 14) BASED ON THE DISTANCE FROM THE EQUIPMENT TO THE NEAREST SENSITIVE RECEPTOR, THE CONCENTRATION OF THE FOLLOWING 1401 TOXICS, IN PPMV, AT THE OUTLET OF THE FINAL ADSORBER SHALL NOT EXCEED THE FOLLOWING LIMITS:

METERS	BENZENE, FOR GASOLINE CONTAMINATED SITES	PCE OR TCE, FOR DRY CLEANING FLUID OR DEGREASER CONTAMINATED SITES
25<49	0.29	0.69
50<74	0.63	1.5
75<99	1.17	2.7
100<199	1.9	4.4
>=200	2.1	4.9

ORIGINAL



SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT
21865 East Copley Drive, Diamond Bar, CA 91765

PERMIT TO CONSTRUCT/OPERATE

page 4
Permit No.
R-F45563
A/N 390569

CONTINUATION OF PERMIT TO CONSTRUCT/OPERATE

- 15) THIS EQUIPMENT SHALL ONLY BE USED TO TREAT THE FOLLOWING COMPOUNDS:

BENZENE
TOLUENE
XYLENES
MTBE
MEK
ETHYLBENZENE
1-1 DICHLOROETHANE
1-2 DICHLOROETHENE
TRICHLOROETHENE
1-1-2 TRICHLOROETHANE
PERCHLOROETHYLENE
1-1-1 TRICHLOROETHANE

- 16) WHENEVER THE OUTLET OF THE PRIMARY ADSORBER REACHES 10 PPMV, AS HEXANE, THE VAPOR CONTROL SYSTEM SHALL BE SHUT DOWN AND THE PRIMARY ADSORBER REPLACED WITH FRESH CARBON OR WITH THE SECONDARY VESSEL AND THE SECONDARY VESSEL REPLACED WITH FRESH CARBON (CARBON WITH CTC ACTIVITY NUMBER AT LEAST 60, ASTM D3467).
- 17) THE CARBON ADSORBERS SHALL BE CONNECTED IN SERIES. EACH CARBON ADSORBER SHALL CONTAIN AT LEAST 1000 POUNDS OF ACTIVATED CARBON.
- 18) THIS EQUIPMENT SHALL NOT BE INITIALLY OPERATED WITHIN 1000 FEET OF ANY SCHOOL AND SHALL NOT BE OPERATED WITHIN 25 METERS OF ANY SENSITIVE RECEPTOR (SEE CONDITION 5 FOR DEFINITION OF SENSITIVE RECEPTOR).
- 19) THE STACK HEIGHT SHALL BE A MINIMUM OF 14'-0" ABOVE GRADE.
- 20) RECORDS SHALL BE MAINTAINED AS REQUIRED BY THIS PERMIT FOR AT LEAST TWO YEARS AND BE MADE AVAILABLE TO AQMD PERSONNEL UPON REQUEST.

THIS PERMIT TO CONSTRUCT/OPERATE R-F45563 SUPERSEDES PERMIT TO CONSTRUCT/OPERATE F45563 ISSUED 10/24/2001.

NOTICE

IN ACCORDANCE WITH RULE 206, THIS PERMIT TO OPERATE OR COPY SHALL BE POSTED ON OR WITHIN 8 METERS OF THE EQUIPMENT.

ORIGINAL



SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT
21865 East Copley Drive, Diamond Bar, CA 91765

PERMIT TO CONSTRUCT/OPERATE

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Permit No.
R-F45563
A/N 390569

CONTINUATION OF PERMIT TO CONSTRUCT/OPERATE

THIS PERMIT DOES NOT AUTHORIZE THE EMISSION OF AIR CONTAMINANTS IN EXCESS OF THOSE ALLOWED BY DIVISION 26 OF THE HEALTH AND SAFETY CODE OF THE STATE OF CALIFORNIA OR THE RULES OF THE AIR QUALITY MANAGEMENT DISTRICT. THIS PERMIT CANNOT BE CONSIDERED AS PERMISSION TO VIOLATE EXISTING LAWS, ORDINANCES, REGULATIONS OR STATUTES OF OTHER GOVERNMENT AGENCIES.

EXECUTIVE OFFICER

Dorris M. Bailey

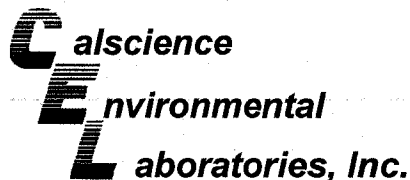
By Dorris M. Bailey/tk01
10/31/01

ORIGINAL

Appendix D

Appendix D

Laboratory Analytical Reports



October 30, 2006

Steven Fry
Blasland, Bouck & Lee, Inc.
2600 Michelson Drive, Suite 830
Irvine, CA 92612-6520

Subject: **Calscience Work Order No.: 06-10-1351**
Client Reference: **NGSC Former Y-12 Facility / 37134**

Dear Client:

Enclosed is an analytical report for the above-referenced project. The samples included in this report were received 10/24/2006 and analyzed in accordance with the attached chain-of-custody.

Unless otherwise noted, all analytical testing was accomplished in accordance with the guidelines established in our Quality Systems Manual, applicable standard operating procedures, and other related documentation. The original report of subcontracted analysis, if any, is provided herein, and follows the standard Calscience data package. The results in this analytical report are limited to the samples tested and any reproduction thereof must be made in its entirety.

If you have any questions regarding this report, please do not hesitate to contact the undersigned.

Sincerely,

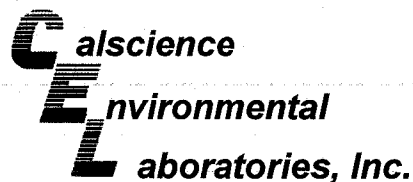
A handwritten signature in black ink, appearing to read 'S. Nowak'.

Calscience Environmental
Laboratories, Inc.
Stephen Nowak
Project Manager

CA-ELAP ID: 1230 • NELAP ID: 03220CA • CSDLAC ID: 10109 • SCAQMD ID: 93LA0830

7440 Lincoln Way, Garden Grove, CA 92841-1427 • TEL: (714) 895-5494 • FAX: (714) 894-7501

OCVOCRWQCB004181



Analytical Report



Blasland, Bouck & Lee, Inc.
2600 Michelson Drive, Suite 830
Irvine, CA 92612-6520

Date Received: 10/24/06
Work Order No: 06-10-1351
Preparation: N/A
Method: EPA TO-15
Units: ppb (v/v)

Project: NGSC Former Y-12 Facility / 37134

Page 1 of 6

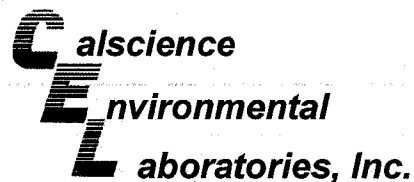
Client Sample Number	Lab Sample Number	Date Collected	Matrix	Date Prepared	Date Analyzed	QC Batch ID
Inlet-102406-A	06-10-1351-1	10/24/06	Air	N/A	10/24/06	061024L01

Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Acetone	38	2	1		t-1,2-Dichloroethene	ND	0.50	1	
Benzene	1.1	0.5	1		t-1,3-Dichloropropene	ND	1.0	1	
Benzyl Chloride	ND	1.0	1		Ethylbenzene	19	0.50	1	
Bromodichloromethane	ND	0.50	1		4-Ethyltoluene	41	0.50	1	
Bromoform	ND	0.50	1		Hexachloro-1,3-Butadiene	ND	1.0	1	
Bromomethane	ND	0.50	1		2-Hexanone	ND	1.0	1	
2-Butanone	43	1	1		Methyl-t-Butyl Ether (MTBE)	ND	2.0	1	
Carbon Disulfide	3.4	0.5	1		Methylene Chloride	12	10	1	
Carbon Tetrachloride	ND	0.50	1		4-Methyl-2-Pentanone	ND	1.0	1	
Chlorobenzene	ND	0.50	1		o-Xylene	23	2	5	
Chloroethane	ND	0.50	1		p/m-Xylene	88	1	1	
Chloroform	0.65	0.50	1		Styrene	ND	1.0	1	
Chloromethane	0.70	0.50	1		Tetrachloroethene	110	2	5	
Dibromochloromethane	ND	0.50	1		Toluene	14	0.50	1	
Dichlorodifluoromethane	0.63	0.50	1		Trichloroethene	330	10	20	
1,1-Dichloroethane	2.4	0.5	1		Trichlorofluoromethane	ND	1.0	1	
1,1-Dichloroethene	370	10	20		1,1,2-Trichloro-1,2,2-Trifluoroethane	ND	1.0	1	
1,2-Dibromoethane	ND	0.50	1		1,1,1-Trichloroethane	30	0.50	1	
Dichlorotetrafluoroethane	ND	2.0	1		1,1,2-Trichloroethane	0.83	0.50	1	
1,2-Dichlorobenzene	ND	0.50	1		1,3,5-Trimethylbenzene	20	2	5	
1,2-Dichloroethane	0.51	0.50	1		1,1,2,2-Tetrachloroethane	ND	1.0	1	
1,2-Dichloropropane	ND	0.50	1		1,2,4-Trimethylbenzene	68	5	5	
1,3-Dichlorobenzene	ND	0.50	1		1,2,4-Trichlorobenzene	ND	1.0	1	
1,4-Dichlorobenzene	ND	0.50	1		Vinyl Acetate	ND	1.0	1	
c-1,3-Dichloropropene	ND	0.50	1		Vinyl Chloride	ND	0.50	1	
c-1,2-Dichloroethene	ND	0.50	1						
Surrogates:	REC (%)	Control Limits	Qual		Surrogates:	REC (%)	Control Limits	Qual	
1,4-Bromofluorobenzene	108	57-129			1,2-Dichloroethane-d4	127	47-137		
Toluene-d8	105	78-156							

RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

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OCVOCRWQCB004182



Analytical Report



Blasland, Bouck & Lee, Inc.
2600 Michelson Drive, Suite 830
Irvine, CA 92612-6520

Date Received: 10/24/06
Work Order No: 06-10-1351
Preparation: N/A
Method: EPA TO-15
Units: ppb (v/v)

Project: NGSC Former Y-12 Facility / 37134

Page 2 of 6

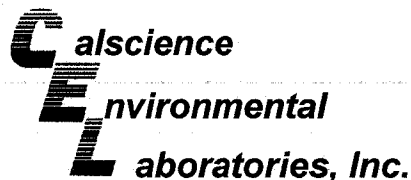
Client Sample Number	Lab Sample Number	Date Collected	Matrix	Date Prepared	Date Analyzed	QC Batch ID
Inlet-102406-B	06-10-1351-2	10/24/06	Air	N/A	10/25/06	061024L01

Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Acetone	43	2	1		t-1,2-Dichloroethene	ND	0.50	1	
Benzene	0.53	0.50	1		t-1,3-Dichloropropene	ND	1.0	1	
Benzyl Chloride	ND	1.0	1		Ethylbenzene	ND	0.50	1	
Bromodichloromethane	ND	0.50	1		4-Ethyltoluene	ND	0.50	1	
Bromoform	ND	0.50	1		Hexachloro-1,3-Butadiene	ND	1.0	1	
Bromomethane	ND	0.50	1		2-Hexanone	ND	1.0	1	
2-Butanone	45	1	1		Methyl-t-Butyl Ether (MTBE)	ND	2.0	1	
Carbon Disulfide	3.1	0.5	1		Methylene Chloride	ND	10	1	
Carbon Tetrachloride	ND	0.50	1		4-Methyl-2-Pentanone	ND	1.0	1	
Chlorobenzene	ND	0.50	1		o-Xylene	0.88	0.50	1	
Chloroethane	ND	0.50	1		p/m-Xylene	1.9	1.0	1	
Chloroform	0.78	0.50	1		Styrene	ND	1.0	1	
Chloromethane	0.68	0.50	1		Tetrachloroethene	170	10	20	
Dibromochloromethane	ND	0.50	1		Toluene	2.8	0.5	1	
Dichlorodifluoromethane	0.60	0.50	1		Trichloroethene	600	10	20	
1,1-Dichloroethane	3.1	0.5	1		Trichlorofluoromethane	ND	1.0	1	
1,1-Dichloroethene	510	10	20		1,1,2-Trichloro-1,2,2-Trifluoroethane	ND	1.0	1	
1,2-Dibromoethane	ND	0.50	1		1,1,1-Trichloroethane	37	0.50	1	
Dichlorotetrafluoroethane	ND	2.0	1		1,1,2-Trichloroethane	1.2	0.5	1	
1,2-Dichlorobenzene	ND	0.50	1		1,3,5-Trimethylbenzene	ND	0.50	1	
1,2-Dichloroethane	0.54	0.50	1		1,1,2,2-Tetrachloroethane	ND	1.0	1	
1,2-Dichloropropane	ND	0.50	1		1,2,4-Trimethylbenzene	1.8	1.0	1	
1,3-Dichlorobenzene	ND	0.50	1		1,2,4-Trichlorobenzene	ND	1.0	1	
1,4-Dichlorobenzene	ND	0.50	1		Vinyl Acetate	ND	1.0	1	
c-1,3-Dichloropropene	ND	0.50	1		Vinyl Chloride	ND	0.50	1	
c-1,2-Dichloroethene	0.62	0.50	1						
Surrogates:	REC (%)	Control Limits	Qual		Surrogates:	REC (%)	Control Limits	Qual	
1,4-Bromofluorobenzene	103	57-129			1,2-Dichloroethane-d4	104	47-137		
Toluene-d8	102	78-156							

RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

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OCVOCRWQCB004183



Analytical Report



Blasland, Bouck & Lee, Inc.
2600 Michelson Drive, Suite 830
Irvine, CA 92612-6520

Date Received: 10/24/06
Work Order No: 06-10-1351
Preparation: N/A
Method: EPA TO-15
Units: ppb (v/v)

Project: NGSC Former Y-12 Facility / 37134

Page 3 of 6

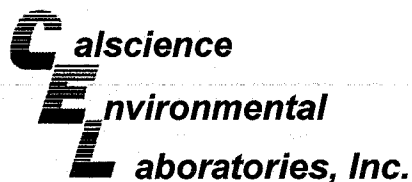
Client Sample Number	Lab Sample Number	Date Collected	Matrix	Date Prepared	Date Analyzed	QC Batch ID
Inlet-102406-B-D	06-10-1351-3	10/24/06	Air	N/A	10/25/06	061024L01

Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Acetone	37	2	1		t-1,2-Dichloroethene	ND	0.50	1	
Benzene	ND	0.50	1		t-1,3-Dichloropropene	ND	1.0	1	
Benzyl Chloride	ND	1.0	1		Ethylbenzene	ND	0.50	1	
Bromodichloromethane	ND	0.50	1		4-Ethyltoluene	ND	0.50	1	
Bromoform	ND	0.50	1		Hexachloro-1,3-Butadiene	ND	1.0	1	
Bromomethane	ND	0.50	1		2-Hexanone	ND	1.0	1	
2-Butanone	36	1	1		Methyl-t-Butyl Ether (MTBE)	ND	2.0	1	
Carbon Disulfide	3.1	0.5	1		Methylene Chloride	ND	10	1	
Carbon Tetrachloride	ND	0.50	1		4-Methyl-2-Pentanone	ND	1.0	1	
Chlorobenzene	ND	0.50	1		o-Xylene	ND	0.50	1	
Chloroethane	ND	0.50	1		p/m-Xylene	1.1	1.0	1	
Chloroform	0.73	0.50	1		Styrene	ND	1.0	1	
Chloromethane	0.79	0.50	1		Tetrachloroethene	140	13	25	
Dibromochloromethane	ND	0.50	1		Toluene	2.0	0.5	1	
Dichlorodifluoromethane	0.63	0.50	1		Trichloroethene	460	13	25	
1,1-Dichloroethane	2.8	0.5	1		Trichlorofluoromethane	ND	1.0	1	
1,1-Dichloroethene	410	13	25		1,1,2-Trichloro-1,2,2-Trifluoroethane	ND	1.0	1	
1,2-Dibromoethane	ND	0.50	1		1,1,1-Trichloroethane	26	0.50	1	
Dichlorotetrafluoroethane	ND	2.0	1		1,1,2-Trichloroethane	1.5	0.5	1	
1,2-Dichlorobenzene	ND	0.50	1		1,3,5-Trimethylbenzene	ND	0.50	1	
1,2-Dichloroethane	ND	0.50	1		1,1,2,2-Tetrachloroethane	ND	1.0	1	
1,2-Dichloropropane	ND	0.50	1		1,2,4-Trimethylbenzene	ND	1.0	1	
1,3-Dichlorobenzene	ND	0.50	1		1,2,4-Trichlorobenzene	ND	1.0	1	
1,4-Dichlorobenzene	ND	0.50	1		Vinyl Acetate	ND	1.0	1	
c-1,3-Dichloropropene	ND	0.50	1		Vinyl Chloride	ND	0.50	1	
c-1,2-Dichloroethene	0.59	0.50	1						
Surrogates:	REC (%)	Control Limits	Qual		Surrogates:	REC (%)	Control Limits	Qual	
1,4-Bromofluorobenzene	103	57-129			1,2-Dichloroethane-d4	110	47-137		
Toluene-d8	140	78-156							

RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

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OCVOCRWQCB004184



Analytical Report



Blasland, Bouck & Lee, Inc.
2600 Michelson Drive, Suite 830
Irvine, CA 92612-6520

Date Received: 10/24/06
Work Order No: 06-10-1351
Preparation: N/A
Method: EPA TO-15
Units: ppb (v/v)

Project: NGSC Former Y-12 Facility / 37134

Page 4 of 6

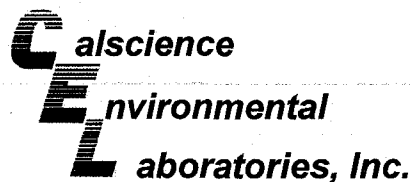
Client Sample Number	Lab Sample Number	Date Collected	Matrix	Date Prepared	Date Analyzed	QC Batch ID
Inlet-102406-C	06-10-1351-4	10/24/06	Air	N/A	10/25/06	061024L01

Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Acetone	4000	500	250		t-1,2-Dichloroethene	24	4	8	
Benzene	6.9	4.0	8		t-1,3-Dichloropropene	ND	8.0	8	
Benzyl Chloride	ND	8.0	8		Ethylbenzene	17	4	8	
Bromodichloromethane	ND	4.0	8		4-Ethyltoluene	27	4	8	
Bromoform	ND	4.0	8		Hexachloro-1,3-Butadiene	ND	8.0	8	
Bromomethane	ND	4.0	8		2-Hexanone	ND	8.0	8	
2-Butanone	360	8	8		Methyl-t-Butyl Ether (MTBE)	ND	16	8	
Carbon Disulfide	4.1	4.0	8		Methylene Chloride	ND	80	8	
Carbon Tetrachloride	ND	4.0	8		4-Methyl-2-Pentanone	ND	8.0	8	
Chlorobenzene	ND	4.0	8		o-Xylene	54	4	8	
Chloroethane	ND	4.0	8		p/m-Xylene	79	8	8	
Chloroform	35	4	8		Styrene	ND	8.0	8	
Chloromethane	ND	4.0	8		Tetrachloroethene	4300	130	250	
Dibromochloromethane	ND	4.0	8		Toluene	15	4	8	
Dichlorodifluoromethane	ND	4.0	8		Trichloroethene	23000	500	1000	
1,1-Dichloroethane	130	4	8		Trichlorofluoromethane	ND	8.0	8	
1,1-Dichloroethene	25000	500	1000		1,1,2-Trichloro-1,2,2-Trifluoroethane	37	8	8	
1,2-Dibromoethane	ND	4.0	8		1,1,1-Trichloroethane	1900	130	250	
Dichlorotetrafluoroethane	ND	16	8		1,1,2-Trichloroethane	34	4	8	
1,2-Dichlorobenzene	ND	4.0	8		1,3,5-Trimethylbenzene	42	4	8	
1,2-Dichloroethane	21	4	8		1,1,2,2-Tetrachloroethane	ND	8.0	8	
1,2-Dichloropropane	ND	4.0	8		1,2,4-Trimethylbenzene	140	8	8	
1,3-Dichlorobenzene	ND	4.0	8		1,2,4-Trichlorobenzene	ND	8.0	8	
1,4-Dichlorobenzene	ND	4.0	8		Vinyl Acetate	ND	8.0	8	
c-1,3-Dichloropropene	ND	4.0	8		Vinyl Chloride	ND	4.0	8	
c-1,2-Dichloroethene	28	4	8						
Surrogates:	REC (%)	Control Limits	Qual	Surrogates:	REC (%)	Control Limits	Qual		
1,4-Bromofluorobenzene	101	57-129		1,2-Dichloroethane-d4	97	47-137			
Toluene-d8	102	78-156							

RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

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OCVOCRWQCB004185



Analytical Report



Blasland, Bouck & Lee, Inc.
2600 Michelson Drive, Suite 830
Irvine, CA 92612-6520

Date Received: 10/24/06
Work Order No: 06-10-1351
Preparation: N/A
Method: EPA TO-15
Units: ppb (v/v)

Project: NGSC Former Y-12 Facility / 37134

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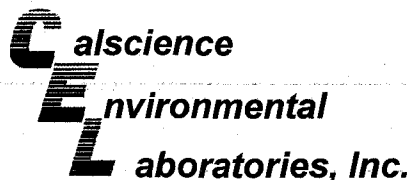
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Method Blank	095-01-021-4,278	N/A	Air	N/A	10/24/06	061024L01

Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Acetone	ND	2.0	1		t-1,2-Dichloroethene	ND	0.50	1	
Benzene	ND	0.50	1		t-1,3-Dichloropropene	ND	1.0	1	
Benzyl Chloride	ND	1.0	1		Ethylbenzene	ND	0.50	1	
Bromodichloromethane	ND	0.50	1		4-Ethyltoluene	ND	0.50	1	
Bromoform	ND	0.50	1		Hexachloro-1,3-Butadiene	ND	1.0	1	
Bromomethane	ND	0.50	1		2-Hexanone	ND	1.0	1	
2-Butanone	ND	1.0	1		Methyl-t-Butyl Ether (MTBE)	ND	2.0	1	
Carbon Disulfide	ND	0.50	1		Methylene Chloride	ND	10	1	
Carbon Tetrachloride	ND	0.50	1		4-Methyl-2-Pentanone	ND	1.0	1	
Chlorobenzene	ND	0.50	1		o-Xylene	ND	0.50	1	
Chloroethane	ND	0.50	1		p/m-Xylene	ND	1.0	1	
Chloroform	ND	0.50	1		Styrene	ND	1.0	1	
Chloromethane	ND	0.50	1		Tetrachloroethene	ND	0.50	1	
Dibromochloromethane	ND	0.50	1		Toluene	ND	0.50	1	
Dichlorodifluoromethane	ND	0.50	1		Trichloroethene	ND	0.50	1	
1,1-Dichloroethane	ND	0.50	1		Trichlorofluoromethane	ND	1.0	1	
1,1-Dichloroethene	ND	0.50	1		1,1,2-Trichloro-1,2,2-Trifluoroethane	ND	1.0	1	
1,2-Dibromoethane	ND	0.50	1		1,1,1-Trichloroethane	ND	0.50	1	
Dichlorotetrafluoroethane	ND	2.0	1		1,1,2-Trichloroethane	ND	0.50	1	
1,2-Dichlorobenzene	ND	0.50	1		1,3,5-Trimethylbenzene	ND	0.50	1	
1,2-Dichloroethane	ND	0.50	1		1,1,2,2-Tetrachloroethane	ND	1.0	1	
1,2-Dichloropropane	ND	0.50	1		1,2,4-Trimethylbenzene	ND	1.0	1	
1,3-Dichlorobenzene	ND	0.50	1		1,2,4-Trichlorobenzene	ND	1.0	1	
1,4-Dichlorobenzene	ND	0.50	1		Vinyl Acetate	ND	1.0	1	
c-1,3-Dichloropropene	ND	0.50	1		Vinyl Chloride	ND	0.50	1	
c-1,2-Dichloroethene	ND	0.50	1						
Surrogates:	REC (%)	Control Limits	Qual	Surrogates:	REC (%)	Control Limits	Qual		
1,4-Bromofluorobenzene	92	57-129		1,2-Dichloroethane-d4	124	47-137			
Toluene-d8	94	78-156							

RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

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OCVOCRWQCB004186



Analytical Report



Blasland, Bouck & Lee, Inc.
2600 Michelson Drive, Suite 830
Irvine, CA 92612-6520

Date Received: 10/24/06
Work Order No: 06-10-1351
Preparation: N/A
Method: EPA TO-15
Units: ppb (v/v)

Project: NGSC Former Y-12 Facility / 37134

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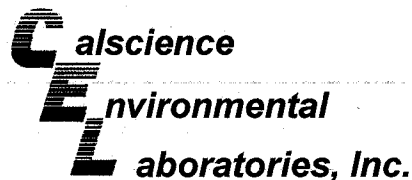
Client Sample Number	Lab Sample Number	Date Collected	Matrix	Date Prepared	Date Analyzed	QC Batch ID
Method Blank	095-01-021-4,281	N/A	Air	N/A	10/25/06	061025L01

Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Acetone	ND	2.0	1		t-1,2-Dichloroethene	ND	0.50	1	
Benzene	ND	0.50	1		t-1,3-Dichloropropene	ND	1.0	1	
Benzyl Chloride	ND	1.0	1		Ethylbenzene	ND	0.50	1	
Bromodichloromethane	ND	0.50	1		4-Ethyltoluene	ND	0.50	1	
Bromoform	ND	0.50	1		Hexachloro-1,3-Butadiene	ND	1.0	1	
Bromomethane	ND	0.50	1		2-Hexanone	ND	1.0	1	
2-Butanone	ND	1.0	1		Methyl-t-Butyl Ether (MTBE)	ND	2.0	1	
Carbon Disulfide	ND	0.50	1		Methylene Chloride	ND	10	1	
Carbon Tetrachloride	ND	0.50	1		4-Methyl-2-Pentanone	ND	1.0	1	
Chlorobenzene	ND	0.50	1		o-Xylene	ND	0.50	1	
Chloroethane	ND	0.50	1		p/m-Xylene	ND	1.0	1	
Chloroform	ND	0.50	1		Styrene	ND	1.0	1	
Chloromethane	ND	0.50	1		Tetrachloroethene	ND	0.50	1	
Dibromochloromethane	ND	0.50	1		Toluene	ND	0.50	1	
Dichlorodifluoromethane	ND	0.50	1		Trichloroethene	ND	0.50	1	
1,1-Dichloroethane	ND	0.50	1		Trichlorofluoromethane	ND	1.0	1	
1,1-Dichloroethene	ND	0.50	1		1,1,2-Trichloro-1,2,2-Trifluoroethane	ND	1.0	1	
1,2-Dibromoethane	ND	0.50	1		1,1,1-Trichloroethane	ND	0.50	1	
Dichlorotetrafluoroethane	ND	2.0	1		1,1,2-Trichloroethane	ND	0.50	1	
1,2-Dichlorobenzene	ND	0.50	1		1,3,5-Trimethylbenzene	ND	0.50	1	
1,2-Dichloroethane	ND	0.50	1		1,1,2,2-Tetrachloroethane	ND	1.0	1	
1,2-Dichloropropane	ND	0.50	1		1,2,4-Trimethylbenzene	ND	1.0	1	
1,3-Dichlorobenzene	ND	0.50	1		1,2,4-Trichlorobenzene	ND	1.0	1	
1,4-Dichlorobenzene	ND	0.50	1		Vinyl Acetate	ND	1.0	1	
c-1,3-Dichloropropene	ND	0.50	1		Vinyl Chloride	ND	0.50	1	
c-1,2-Dichloroethene	ND	0.50	1						
Surrogates:	REC (%)	Control Limits		Qual	Surrogates:	REC (%)	Control Limits		Qual
1,4-Bromofluorobenzene	99	57-129			1,2-Dichloroethane-d4	103	47-137		
Toluene-d8	99	78-156							

RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

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OCVOCRWQCB004187



Analytical Report



Blasland, Bouck & Lee, Inc.
2600 Michelson Drive, Suite 830
Irvine, CA 92612-6520

Date Received: 10/24/06
Work Order No: 06-10-1351
Preparation: EPA 5030B
Method: EPA 8260B
Units: ug/L

Project: NGSC Former Y-12 Facility / 37134

Page 1 of 4

Client Sample Number	Lab Sample Number	Date Collected	Matrix	Date Prepared	Date Analyzed	QC Batch ID
GW-102406	06-10-1351-5	10/24/06	Aqueous	10/27/06	10/27/06	061027L01

Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Acetone	ND	100	2		1,3-Dichloropropane	ND	2.0	2	
Benzene	ND	1.0	2		2,2-Dichloropropane	ND	2.0	2	
Bromobenzene	ND	2.0	2		1,1-Dichloropropene	ND	2.0	2	
Bromochloromethane	ND	2.0	2		c-1,3-Dichloropropene	ND	1.0	2	
Bromodichloromethane	2.8	2.0	2		t-1,3-Dichloropropene	ND	1.0	2	
Bromoform	ND	2.0	2		Ethylbenzene	ND	2.0	2	
Bromomethane	ND	20	2		2-Hexanone	ND	20	2	
2-Butanone	250	20	2		Isopropylbenzene	ND	2.0	2	
n-Butylbenzene	ND	2.0	2		p-Isopropyltoluene	ND	2.0	2	
sec-Butylbenzene	ND	2.0	2		Methylene Chloride	ND	20	2	
tert-Butylbenzene	ND	2.0	2		4-Methyl-2-Pentanone	ND	20	2	
Carbon Disulfide	ND	20	2		Naphthalene	ND	20	2	
Carbon Tetrachloride	ND	1.0	2		n-Propylbenzene	ND	2.0	2	
Chlorobenzene	ND	2.0	2		Styrene	ND	2.0	2	
Chloroethane	ND	2.0	2		1,1,1,2-Tetrachloroethane	ND	2.0	2	
Chloroform	ND	2.0	2		1,1,2,2-Tetrachloroethane	ND	2.0	2	
Chloromethane	ND	20	2		Tetrachloroethene	ND	2.0	2	
2-Chlorotoluene	ND	2.0	2		Toluene	ND	2.0	2	
4-Chlorotoluene	ND	2.0	2		1,2,3-Trichlorobenzene	ND	2.0	2	
Dibromochloromethane	2.3	2.0	2		1,2,4-Trichlorobenzene	ND	2.0	2	
1,2-Dibromo-3-Chloropropane	ND	10	2		1,1,1-Trichloroethane	ND	2.0	2	
1,2-Dibromoethane	ND	2.0	2		1,1,2-Trichloro-1,2,2-Trifluoroethane	ND	20	2	
Dibromomethane	ND	2.0	2		1,1,2-Trichloroethane	ND	2.0	2	
1,2-Dichlorobenzene	ND	2.0	2		Trichloroethene	ND	2.0	2	
1,3-Dichlorobenzene	ND	2.0	2		Trichlorofluoromethane	ND	20	2	
1,4-Dichlorobenzene	ND	2.0	2		1,2,3-Trichloropropane	ND	10	2	
Dichlorodifluoromethane	ND	2.0	2		1,2,4-Trimethylbenzene	ND	2.0	2	
1,1-Dichloroethane	ND	2.0	2		1,3,5-Trimethylbenzene	ND	2.0	2	
1,2-Dichloroethane	ND	1.0	2		Vinyl Acetate	ND	20	2	
1,1-Dichloroethene	ND	2.0	2		Vinyl Chloride	ND	1.0	2	
c-1,2-Dichloroethene	ND	2.0	2		p/m-Xylene	ND	2.0	2	
t-1,2-Dichloroethene	ND	2.0	2		o-Xylene	ND	2.0	2	
1,2-Dichloropropane	ND	2.0	2		Methyl-t-Butyl Ether (MTBE)	ND	2.0	2	
Surrogates:	REC (%)	Control Limits	Qual		Surrogates:	REC (%)	Control Limits	Qual	
Dibromofluoromethane	103	74-140			1,2-Dichloroethane-d4	104	74-146		
Toluene-d8	94	88-112			1,4-Bromofluorobenzene	91	74-110		

RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

7440 Lincoln Way, Garden Grove, CA 92841-1427 • TEL: (714) 895-5494 • FAX: (714) 894-7501

OCVOCRWQCB004188

Analytical Report



Blasland, Bouck & Lee, Inc.
 2600 Michelson Drive, Suite 830
 Irvine, CA 92612-6520

Date Received: 10/24/06
 Work Order No: 06-10-1351
 Preparation: EPA 5030B
 Method: EPA 8260B
 Units: ug/L

Project: NGSC Former Y-12 Facility / 37134

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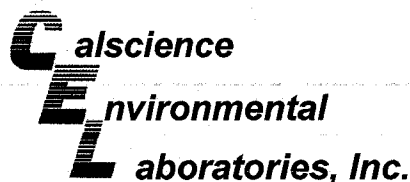
Client Sample Number	Lab Sample Number	Date Collected	Matrix	Date Prepared	Date Analyzed	QC Batch ID
TB-102406	06-10-1351-6	10/24/06	Aqueous	10/26/06	10/26/06	061026L01

Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Acetone	ND	50	1		1,3-Dichloropropane	ND	1.0	1	
Benzene	ND	0.50	1		2,2-Dichloropropane	ND	1.0	1	
Bromobenzene	ND	1.0	1		1,1-Dichloropropene	ND	1.0	1	
Bromochloromethane	ND	1.0	1		c-1,3-Dichloropropene	ND	0.50	1	
Bromodichloromethane	ND	1.0	1		t-1,3-Dichloropropene	ND	0.50	1	
Bromoform	ND	1.0	1		Ethylbenzene	ND	1.0	1	
Bromomethane	ND	10	1		2-Hexanone	ND	10	1	
2-Butanone	ND	10	1		Isopropylbenzene	ND	1.0	1	
n-Butylbenzene	ND	1.0	1		p-Isopropyltoluene	ND	1.0	1	
sec-Butylbenzene	ND	1.0	1		Methylene Chloride	ND	10	1	
tert-Butylbenzene	ND	1.0	1		4-Methyl-2-Pentanone	ND	10	1	
Carbon Disulfide	ND	10	1		Naphthalene	ND	10	1	
Carbon Tetrachloride	ND	0.50	1		n-Propylbenzene	ND	1.0	1	
Chlorobenzene	ND	1.0	1		Styrene	ND	1.0	1	
Chloroethane	ND	1.0	1		1,1,1,2-Tetrachloroethane	ND	1.0	1	
Chloroform	ND	1.0	1		1,1,2,2-Tetrachloroethane	ND	1.0	1	
Chloromethane	ND	10	1		Tetrachloroethene	ND	1.0	1	
2-Chlorotoluene	ND	1.0	1		Toluene	ND	1.0	1	
4-Chlorotoluene	ND	1.0	1		1,2,3-Trichlorobenzene	ND	1.0	1	
Dibromochloromethane	ND	1.0	1		1,2,4-Trichlorobenzene	ND	1.0	1	
1,2-Dibromo-3-Chloropropane	ND	5.0	1		1,1,1-Trichloroethane	ND	1.0	1	
1,2-Dibromoethane	ND	1.0	1		1,1,2-Trichloro-1,2,2-Trifluoroethane	ND	10	1	
Dibromomethane	ND	1.0	1		1,1,2-Trichloroethane	ND	1.0	1	
1,2-Dichlorobenzene	ND	1.0	1		Trichloroethene	ND	1.0	1	
1,3-Dichlorobenzene	ND	1.0	1		Trichlorofluoromethane	ND	10	1	
1,4-Dichlorobenzene	ND	1.0	1		1,2,3-Trichloropropane	ND	5.0	1	
Dichlorodifluoromethane	ND	1.0	1		1,2,4-Trimethylbenzene	ND	1.0	1	
1,1-Dichloroethane	ND	1.0	1		1,3,5-Trimethylbenzene	ND	1.0	1	
1,2-Dichloroethane	ND	0.50	1		Vinyl Acetate	ND	10	1	
1,1-Dichloroethene	ND	1.0	1		Vinyl Chloride	ND	0.50	1	
c-1,2-Dichloroethene	ND	1.0	1		p/m-Xylene	ND	1.0	1	
t-1,2-Dichloroethene	ND	1.0	1		o-Xylene	ND	1.0	1	
1,2-Dichloropropane	ND	1.0	1		Methyl-t-Butyl Ether (MTBE)	ND	1.0	1	
Surrogates:	REC (%)	Control Limits	Qual		Surrogates:	REC (%)	Control Limits	Qual	
Dibromofluoromethane	104	74-140			1,2-Dichloroethane-d4	109	74-146		
Toluene-d8	94	88-112			1,4-Bromofluorobenzene	89	74-110		

RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

7440 Lincoln Way, Garden Grove, CA 92841-1427 • TEL:(714) 895-5494 • FAX: (714) 894-7501

OCVOCRWQCB004189



Analytical Report



Blasland, Bouck & Lee, Inc.
2600 Michelson Drive, Suite 830
Irvine, CA 92612-6520

Date Received: 10/24/06
Work Order No: 06-10-1351
Preparation: EPA 5030B
Method: EPA 8260B
Units: ug/L

Project: NGSC Former Y-12 Facility / 37134

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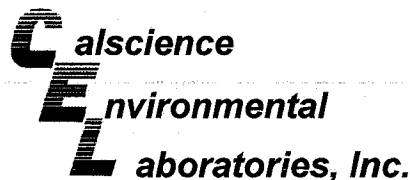
Client Sample Number	Lab Sample Number	Date Collected	Matrix	Date Prepared	Date Analyzed	QC Batch ID
Method Blank	099-10-006-19,436	N/A	Aqueous	10/26/06	10/26/06	061026L01

Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Acetone	ND	50	1		1,3-Dichloropropane	ND	1.0	1	
Benzene	ND	0.50	1		2,2-Dichloropropane	ND	1.0	1	
Bromobenzene	ND	1.0	1		1,1-Dichloropropene	ND	1.0	1	
Bromochloromethane	ND	1.0	1		c-1,3-Dichloropropene	ND	0.50	1	
Bromodichloromethane	ND	1.0	1		t-1,3-Dichloropropene	ND	0.50	1	
Bromoform	ND	1.0	1		Ethylbenzene	ND	1.0	1	
Bromomethane	ND	10	1		2-Hexanone	ND	10	1	
2-Butanone	ND	10	1		Isopropylbenzene	ND	1.0	1	
n-Butylbenzene	ND	1.0	1		p-Isopropyltoluene	ND	1.0	1	
sec-Butylbenzene	ND	1.0	1		Methylene Chloride	ND	10	1	
tert-Butylbenzene	ND	1.0	1		4-Methyl-2-Pentanone	ND	10	1	
Carbon Disulfide	ND	10	1		Naphthalene	ND	10	1	
Carbon Tetrachloride	ND	0.50	1		n-Propylbenzene	ND	1.0	1	
Chlorobenzene	ND	1.0	1		Styrene	ND	1.0	1	
Chloroethane	ND	1.0	1		1,1,1,2-Tetrachloroethane	ND	1.0	1	
Chloroform	ND	1.0	1		1,1,2,2-Tetrachloroethane	ND	1.0	1	
Chloromethane	ND	10	1		Tetrachloroethene	ND	1.0	1	
2-Chlorotoluene	ND	1.0	1		Toluene	ND	1.0	1	
4-Chlorotoluene	ND	1.0	1		1,2,3-Trichlorobenzene	ND	1.0	1	
Dibromochloromethane	ND	1.0	1		1,2,4-Trichlorobenzene	ND	1.0	1	
1,2-Dibromo-3-Chloropropane	ND	5.0	1		1,1,1-Trichloroethane	ND	1.0	1	
1,2-Dibromoethane	ND	1.0	1		1,1,2-Trichloro-1,2,2-Trifluoroethane	ND	10	1	
Dibromomethane	ND	1.0	1		1,1,2-Trichloroethane	ND	1.0	1	
1,2-Dichlorobenzene	ND	1.0	1		Trichloroethene	ND	1.0	1	
1,3-Dichlorobenzene	ND	1.0	1		Trichlorofluoromethane	ND	10	1	
1,4-Dichlorobenzene	ND	1.0	1		1,2,3-Trichloropropane	ND	5.0	1	
Dichlorodifluoromethane	ND	1.0	1		1,2,4-Trimethylbenzene	ND	1.0	1	
1,1-Dichloroethane	ND	1.0	1		1,3,5-Trimethylbenzene	ND	1.0	1	
1,2-Dichloroethane	ND	0.50	1		Vinyl Acetate	ND	10	1	
1,1-Dichloroethene	ND	1.0	1		Vinyl Chloride	ND	0.50	1	
c-1,2-Dichloroethene	ND	1.0	1		p/m-Xylene	ND	1.0	1	
t-1,2-Dichloroethene	ND	1.0	1		o-Xylene	ND	1.0	1	
1,2-Dichloropropane	ND	1.0	1		Methyl-t-Butyl Ether (MTBE)	ND	1.0	1	
Surrogates:	REC (%)	Control Limits		Qual	Surrogates:	REC (%)	Control Limits		Qual
Dibromofluoromethane	103	74-140			1,2-Dichloroethane-d4	104	74-146		
Toluene-d8	93	88-112			1,4-Bromofluorobenzene	89	74-110		

RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

7440 Lincoln Way, Garden Grove, CA 92841-1427 • TEL: (714) 895-5494 • FAX: (714) 894-7501

OCVOCRWQCB004190



Analytical Report



Blasland, Bouck & Lee, Inc.
2600 Michelson Drive, Suite 830
Irvine, CA 92612-6520

Date Received: 10/24/06
Work Order No: 06-10-1351
Preparation: EPA 5030B
Method: EPA 8260B
Units: ug/L

Project: NGSC Former Y-12 Facility / 37134

Page 4 of 4

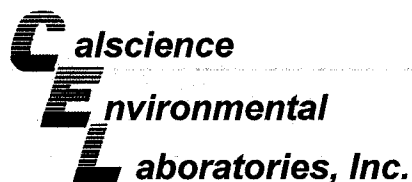
Client Sample Number	Lab Sample Number	Date Collected	Matrix	Date Prepared	Date Analyzed	QC Batch ID
Method Blank	099-10-006-19,448	N/A	Aqueous	10/27/06	10/27/06	061027L01

Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Acetone	ND	50	1		1,3-Dichloropropane	ND	1.0	1	
Benzene	ND	0.50	1		2,2-Dichloropropane	ND	1.0	1	
Bromobenzene	ND	1.0	1		1,1-Dichloropropene	ND	1.0	1	
Bromochloromethane	ND	1.0	1		c-1,3-Dichloropropene	ND	0.50	1	
Bromodichloromethane	ND	1.0	1		t-1,3-Dichloropropene	ND	0.50	1	
Bromoform	ND	1.0	1		Ethylbenzene	ND	1.0	1	
Bromomethane	ND	10	1		2-Hexanone	ND	10	1	
2-Butanone	ND	10	1		Isopropylbenzene	ND	1.0	1	
n-Butylbenzene	ND	1.0	1		p-Isopropyltoluene	ND	1.0	1	
sec-Butylbenzene	ND	1.0	1		Methylene Chloride	ND	10	1	
tert-Butylbenzene	ND	1.0	1		4-Methyl-2-Pentanone	ND	10	1	
Carbon Disulfide	ND	10	1		Naphthalene	ND	10	1	
Carbon Tetrachloride	ND	0.50	1		n-Propylbenzene	ND	1.0	1	
Chlorobenzene	ND	1.0	1		Styrene	ND	1.0	1	
Chloroethane	ND	1.0	1		1,1,1,2-Tetrachloroethane	ND	1.0	1	
Chloroform	ND	1.0	1		1,1,2,2-Tetrachloroethane	ND	1.0	1	
Chloromethane	ND	10	1		Tetrachloroethene	ND	1.0	1	
2-Chlorotoluene	ND	1.0	1		Toluene	ND	1.0	1	
4-Chlorotoluene	ND	1.0	1		1,2,3-Trichlorobenzene	ND	1.0	1	
Dibromochloromethane	ND	1.0	1		1,2,4-Trichlorobenzene	ND	1.0	1	
1,2-Dibromo-3-Chloropropane	ND	5.0	1		1,1,1-Trichloroethane	ND	1.0	1	
1,2-Dibromoethane	ND	1.0	1		1,1,2-Trichloro-1,2,2-Trifluoroethane	ND	10	1	
Dibromomethane	ND	1.0	1		1,1,2-Trichloroethane	ND	1.0	1	
1,2-Dichlorobenzene	ND	1.0	1		Trichloroethene	ND	1.0	1	
1,3-Dichlorobenzene	ND	1.0	1		Trichlorofluoromethane	ND	10	1	
1,4-Dichlorobenzene	ND	1.0	1		1,2,3-Trichloropropane	ND	5.0	1	
Dichlorodifluoromethane	ND	1.0	1		1,2,4-Trimethylbenzene	ND	1.0	1	
1,1-Dichloroethane	ND	1.0	1		1,3,5-Trimethylbenzene	ND	1.0	1	
1,2-Dichloroethane	ND	0.50	1		Vinyl Acetate	ND	10	1	
1,1-Dichloroethene	ND	1.0	1		Vinyl Chloride	ND	0.50	1	
c-1,2-Dichloroethene	ND	1.0	1		p/m-Xylene	ND	1.0	1	
t-1,2-Dichloroethene	ND	1.0	1		o-Xylene	ND	1.0	1	
1,2-Dichloropropane	ND	1.0	1		Methyl-t-Butyl Ether (MTBE)	ND	1.0	1	
Surrogates:	REC (%)	Control Limits	Qual		Surrogates:	REC (%)	Control Limits	Qual	
Dibromofluoromethane	101	74-140			1,2-Dichloroethane-d4	107	74-146		
Toluene-d8	94	88-112			1,4-Bromofluorobenzene	89	74-110		

RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

7440 Lincoln Way, Garden Grove, CA 92841-1427 • TEL: (714) 895-5494 • FAX: (714) 894-7501

OCVOCRWQCB004191



Quality Control - Spike/Spike Duplicate



Blasland, Bouck & Lee, Inc.
2600 Michelson Drive, Suite 830
Irvine, CA 92612-6520

Date Received: 10/24/06
Work Order No: 06-10-1351
Preparation: EPA 5030B
Method: EPA 8260B

Project NGSC Former Y-12 Facility / 37134

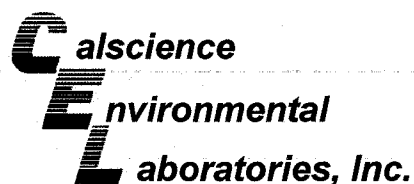
Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
06-10-1393-1	Aqueous	GC/MS T	10/26/06	10/26/06	061026S01

Parameter	MS %REC	MSD %REC	%REC CL	RPD	RPD CL	Qualifiers
Benzene	98	97	88-118	1	0-7	
Carbon Tetrachloride	104	101	67-145	2	0-11	
Chlorobenzene	97	95	88-118	2	0-7	
1,2-Dichlorobenzene	99	99	86-116	0	0-8	
1,1-Dichloroethene	101	98	70-130	3	0-25	
Toluene	98	97	87-123	1	0-8	
Trichloroethene	95	94	79-127	0	0-10	
Vinyl Chloride	89	92	69-129	4	0-13	
Methyl-t-Butyl Ether (MTBE)	100	100	71-131	0	0-13	
Tert-Butyl Alcohol (TBA)	102	112	36-168	9	0-45	
Diisopropyl Ether (DIPE)	101	99	81-123	2	0-9	
Ethyl-t-Butyl Ether (ETBE)	99	99	72-126	0	0-12	
Tert-Amyl-Methyl Ether (TAME)	98	98	72-126	0	0-12	
Ethanol	97	103	53-149	6	0-31	

RPD - Relative Percent Difference, CL - Control Limit

7440 Lincoln Way, Garden Grove, CA 92841-1427 • TEL: (714) 895-5494 • FAX: (714) 894-7501

OCVOCRWQCB004192



Quality Control - Spike/Spike Duplicate



Blasland, Bouck & Lee, Inc.
2600 Michelson Drive, Suite 830
Irvine, CA 92612-6520

Date Received: 10/24/06
Work Order No: 06-10-1351
Preparation: EPA 5030B
Method: EPA 8260B

Project NGSC Former Y-12 Facility / 37134

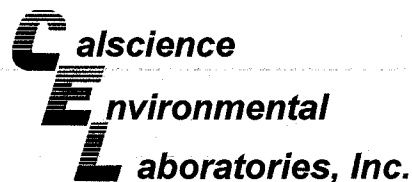
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06-10-1433-5	Aqueous	GC/MS T	10/27/06	10/27/06	061027S01

Parameter	MS %REC	MSD %REC	%REC CL	RPD	RPD CL	Qualifiers
Benzene	96	97	88-118	1	0-7	
Carbon Tetrachloride	106	104	67-145	1	0-11	
Chlorobenzene	98	97	88-118	1	0-7	
1,2-Dichlorobenzene	99	102	86-116	3	0-8	
1,1-Dichloroethene	100	99	70-130	1	0-25	
Toluene	97	98	87-123	1	0-8	
Trichloroethene	97	95	79-127	2	0-10	
Vinyl Chloride	91	94	69-129	4	0-13	
Methyl-t-Butyl Ether (MTBE)	103	105	71-131	2	0-13	
Tert-Butyl Alcohol (TBA)	115	121	36-168	5	0-45	
Diisopropyl Ether (DIPE)	100	100	81-123	0	0-9	
Ethyl-t-Butyl Ether (ETBE)	101	104	72-126	3	0-12	
Tert-Amyl-Methyl Ether (TAME)	98	102	72-126	4	0-12	
Ethanol	104	111	53-149	6	0-31	

RPD - Relative Percent Difference, CL - Control Limit

7440 Lincoln Way, Garden Grove, CA 92841-1427 • TEL: (714) 895-5494 • FAX: (714) 894-7501

OCVOCRWQCB004193



Quality Control - LCS/LCS Duplicate



Blasland, Bouck & Lee, Inc.
2600 Michelson Drive, Suite 830
Irvine, CA 92612-6520

Date Received: N/A
Work Order No: 06-10-1351
Preparation: N/A
Method: EPA TO-15

Project: NGSC Former Y-12 Facility / 37134

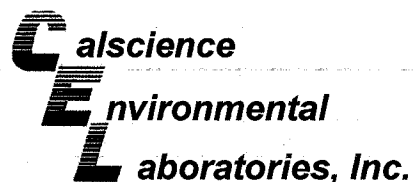
Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number
095-01-021-4,278	Air	GC/MS K	N/A	10/24/06	061024L01

Parameter	LCS %REC	LCSD %REC	%REC CL	RPD	RPD CL	Qualifiers
Benzene	108	96	60-156	12	0-40	
Carbon Tetrachloride	106	93	64-154	13	0-32	
1,2-Dibromoethane	106	98	54-144	7	0-36	
1,2-Dichlorobenzene	91	90	34-160	2	0-47	
1,2-Dichloroethane	124	105	69-153	17	0-30	
1,2-Dichloropropane	112	100	67-157	12	0-35	
1,4-Dichlorobenzene	95	92	36-156	3	0-47	
c-1,3-Dichloropropene	110	99	61-157	11	0-35	
Ethylbenzene	117	110	52-154	6	0-38	
o-Xylene	108	102	52-148	5	0-38	
p/m-Xylene	104	98	42-156	6	0-41	
Tetrachloroethene	101	94	56-152	8	0-40	
Toluene	112	104	56-146	7	0-43	
Trichloroethene	107	95	63-159	12	0-34	
1,1,2-Trichloroethane	107	96	65-149	11	0-37	
Vinyl Chloride	118	114	45-177	4	0-36	

RPD - Relative Percent Difference, CL - Control Limit

7440 Lincoln Way, Garden Grove, CA 92841-1427 • TEL: (714) 895-5494 • FAX: (714) 894-7501

OCVOCRWQCB004194



Quality Control - LCS/LCS Duplicate



Blasland, Bouck & Lee, Inc.
2600 Michelson Drive, Suite 830
Irvine, CA 92612-6520

Date Received: N/A
Work Order No: 06-10-1351
Preparation: N/A
Method: EPA TO-15

Project: NGSC Former Y-12 Facility / 37134

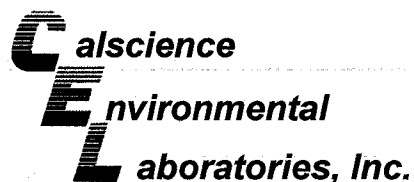
Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number
095-01-021-4,281	Air	GC/MS K	N/A	10/25/06	061025L01

Parameter	LCS %REC	LCSD %REC	%REC CL	RPD	RPD CL	Qualifiers
Benzene	104	116	60-156	11	0-40	
Carbon Tetrachloride	101	114	64-154	12	0-32	
1,2-Dibromoethane	109	117	54-144	7	0-36	
1,2-Dichlorobenzene	96	117	34-160	19	0-47	
1,2-Dichloroethane	126	128	69-153	2	0-30	
1,2-Dichloropropane	106	116	67-157	10	0-35	
1,4-Dichlorobenzene	99	116	36-156	16	0-47	
c-1,3-Dichloropropene	105	116	61-157	10	0-35	
Ethylbenzene	121	135	52-154	11	0-38	
o-Xylene	115	130	52-148	13	0-38	
p/m-Xylene	111	126	42-156	12	0-41	
Tetrachloroethene	107	119	56-152	11	0-40	
Toluene	115	123	56-146	7	0-43	
Trichloroethene	103	118	63-159	14	0-34	
1,1,2-Trichloroethane	100	111	65-149	11	0-37	
Vinyl Chloride	116	119	45-177	2	0-36	

RPD - Relative Percent Difference, CL - Control Limit

7440 Lincoln Way, Garden Grove, CA 92841-1427 • TEL: (714) 895-5494 • FAX: (714) 894-7501

OCVOCRWQCB004195



Quality Control - LCS/LCS Duplicate



Blasland, Bouck & Lee, Inc.
2600 Michelson Drive, Suite 830
Irvine, CA 92612-6520

Date Received: N/A
Work Order No: 06-10-1351
Preparation: EPA 5030B
Method: EPA 8260B

Project: NGSC Former Y-12 Facility / 37134

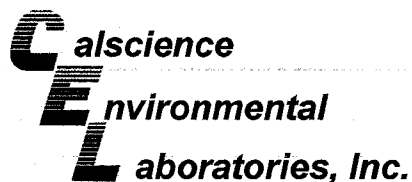
Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number
099-10-006-19,436	Aqueous	GC/MS T	10/26/06	10/26/06	061026L01

Parameter	LCS %REC	LCSD %REC	%REC CL	RPD	RPD CL	Qualifiers
Benzene	95	95	84-120	0	0-8	
Carbon Tetrachloride	101	102	63-147	1	0-10	
Chlorobenzene	93	94	89-119	1	0-7	
1,2-Dichlorobenzene	95	96	89-119	0	0-9	
1,1-Dichloroethene	98	99	77-125	1	0-16	
Toluene	95	95	83-125	0	0-9	
Trichloroethene	92	94	89-119	1	0-8	
Vinyl Chloride	98	93	63-135	5	0-13	
Methyl-t-Butyl Ether (MTBE)	106	102	82-118	4	0-13	
Tert-Butyl Alcohol (TBA)	116	109	46-154	7	0-32	
Diisopropyl Ether (DIPE)	102	100	81-123	2	0-11	
Ethyl-t-Butyl Ether (ETBE)	103	101	74-122	2	0-12	
Tert-Amyl-Methyl Ether (TAME)	101	99	76-124	2	0-10	
Ethanol	117	104	60-138	12	0-32	

RPD - Relative Percent Difference, CL - Control Limit

7440 Lincoln Way, Garden Grove, CA 92841-1427 • TEL: (714) 895-5494 • FAX: (714) 894-7501

OCVOCRWQCB004196



Quality Control - LCS/LCS Duplicate



Blasland, Bouck & Lee, Inc.
2600 Michelson Drive, Suite 830
Irvine, CA 92612-6520

Date Received: N/A
Work Order No: 06-10-1351
Preparation: EPA 5030B
Method: EPA 8260B

Project: NGSC Former Y-12 Facility / 37134

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number
099-10-006-19,448	Aqueous	GC/MS T	10/27/06	10/27/06	061027L01

Parameter	LCS %REC	LCSD %REC	%REC CL	RPD	RPD CL	Qualifiers
Benzene	98	97	84-120	0	0-8	
Carbon Tetrachloride	108	104	63-147	4	0-10	
Chlorobenzene	98	96	89-119	2	0-7	
1,2-Dichlorobenzene	99	100	89-119	1	0-9	
1,1-Dichloroethene	102	99	77-125	2	0-16	
Toluene	99	98	83-125	0	0-9	
Trichloroethene	96	96	89-119	0	0-8	
Vinyl Chloride	95	92	63-135	3	0-13	
Methyl-t-Butyl Ether (MTBE)	106	104	82-118	2	0-13	
Tert-Butyl Alcohol (TBA)	115	113	46-154	2	0-32	
Diisopropyl Ether (DIPE)	103	101	81-123	2	0-11	
Ethyl-t-Butyl Ether (ETBE)	104	103	74-122	2	0-12	
Tert-Amyl-Methyl Ether (TAME)	102	100	76-124	2	0-10	
Ethanol	99	101	60-138	2	0-32	

RPD - Relative Percent Difference, CL - Control Limit

7440 Lincoln Way, Garden Grove, CA 92841-1427 • TEL: (714) 895-5494 • FAX: (714) 894-7501

OCVOCRWQCB004197

Glossary of Terms and Qualifiers

Work Order Number: 06-10-1351

<u>Qualifier</u>	<u>Definition</u>
*	See applicable analysis comment.
1	Surrogate compound recovery was out of control due to a required sample dilution, therefore, the sample data was reported without further clarification.
2	Surrogate compound recovery was out of control due to matrix interference. The associated method blank surrogate spike compound was in control and, therefore, the sample data was reported without further clarification.
3	Recovery of the Matrix Spike or Matrix Spike Duplicate compound was out of control due to matrix interference. The associated LCS and/or LCSD was in control and, therefore, the sample data was reported without further clarification.
4	The MS/MSD RPD was out of control due to matrix interference. The LCS/LCSD RPD was in control and, therefore, the sample data was reported without further clarification.
5	The PDS/PDSD associated with this batch of samples was out of control due to a matrix interference effect. The associated batch LCS/LCSD was in control and, hence, the associated sample data was reported with no further corrective action required.
A	Result is the average of all dilutions, as defined by the method.
B	Analyte was present in the associated method blank.
C	Analyte presence was not confirmed on primary column.
E	Concentration exceeds the calibration range.
H	Sample received and/or analyzed past the recommended holding time.
J	Analyte was detected at a concentration below the reporting limit and above the laboratory method detection limit. Reported value is estimated.
N	Nontarget Analyte.
ND	Parameter not detected at the indicated reporting limit.
Q	Spike recovery and RPD control limits do not apply resulting from the parameter concentration in the sample exceeding the spike concentration by a factor of four or greater.
U	Undetected at the laboratory method detection limit.
X	% Recovery and/or RPD out-of-range.
Z	Analyte presence was not confirmed by second column or GC/MS analysis.

LABORATORIES, INC.

7440 LINCOLN WAY

GARDEN GROVE, CA 92841-1427

TEL: (714) 895-5494 • FAX: (714) 894-7501

CHAIN OF CUSTODY RECORD

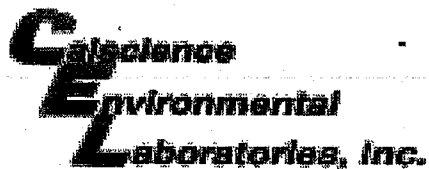
Date 10.24.06

Page 1 of 1[illegible]

DISTRIBUTION: White with final report, Green and Yellow to Client.
Please note that pages 1 and 2 of 2 of our T/Cs are printed on the reverse side of the Green and Yellow copies respectively.

05/10/06 Revision

Page 19 of 20
Q&Q Graphic 714-898-8702



WORK ORDER #: 06 - 10 - 1351

Cooler 1 of 1

SAMPLE RECEIPT FORM

CLIENT: BBL

DATE: 10/24/6

TEMPERATURE - SAMPLES RECEIVED BY:

CALSCIENCE COURIER:

- ☐ Chilled, cooler with temperature blank provided.
☐ Chilled, cooler without temperature blank.
☒ Chilled and placed in cooler with wet ice.
☐ Ambient and placed in cooler with wet ice.
☒ Ambient temperature.

LABORATORY (Other than Calscience Courier):

- ☐ °C Temperature blank.
☐ °C IR thermometer.
☐ Ambient temperature.

3.6 °C Temperature blank.

Initial: [Signature]

CUSTODY SEAL INTACT:

Sample(s): _____ Cooler: _____ No (Not Intact) : _____

Not Present: ☒

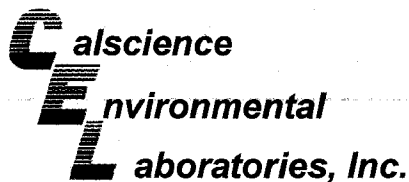
Initial: [Signature]

SAMPLE CONDITION:

	Yes	No	N/A
Chain-Of-Custody document(s) received with samples.....	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sampler's name indicated on COC.....	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sample container label(s) consistent with custody papers.....	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sample container(s) intact and good condition.....	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Correct containers and volume for analyses requested.....	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Proper preservation noted on sample label(s).....	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
VOA vial(s) free of headspace.....	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tedlar bag(s) free of condensation.....	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Initial: [Signature]

COMMENTS:



October 30, 2006

Steven Fry
Blasland, Bouck & Lee, Inc.
2600 Michelson Drive, Suite 830
Irvine, CA 92612-6520

Subject: **Calscience Work Order No.: 06-10-1433**
Client Reference: **NGSC Former Y-12 Facility / 37134**

Dear Client:

Enclosed is an analytical report for the above-referenced project. The samples included in this report were received 10/25/2006 and analyzed in accordance with the attached chain-of-custody.

Unless otherwise noted, all analytical testing was accomplished in accordance with the guidelines established in our Quality Systems Manual, applicable standard operating procedures, and other related documentation. The original report of subcontracted analysis, if any, is provided herein, and follows the standard Calscience data package. The results in this analytical report are limited to the samples tested and any reproduction thereof must be made in its entirety.

If you have any questions regarding this report, please do not hesitate to contact the undersigned.

Sincerely,

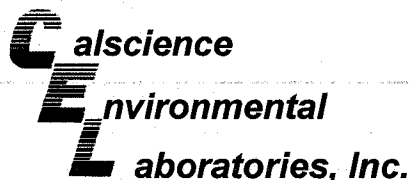
A handwritten signature in black ink, appearing to read "S. Nowak".

Calscience Environmental
Laboratories, Inc.
Stephen Nowak
Project Manager

CA-ELAP ID: 1230 • NELAP ID: 03220CA • CSDLAC ID: 10109 • SCAQMD ID: 93LA0830

7440 Lincoln Way, Garden Grove, CA 92841-1427 • TEL: (714) 895-5494 • FAX: (714) 894-7501

OCVOCRWQCB004201



Analytical Report



Blasland, Bouck & Lee, Inc.
2600 Michelson Drive, Suite 830
Irvine, CA 92612-6520

Date Received: 10/25/06
Work Order No: 06-10-1433
Preparation: N/A
Method: EPA TO-15
Units: ppb (v/v)

Project: NGSC Former Y-12 Facility / 37134

Page 1 of 5

Client Sample Number	Lab Sample Number	Date Collected	Matrix	Date Prepared	Date Analyzed	QC Batch ID
Inlet-102506-A	06-10-1433-2	10/25/06	Air	N/A	10/26/06	061025L01

Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Acetone	19	2	1		t-1,2-Dichloroethene	1.7	0.5	1	
Benzene	1.0	0.5	1		t-1,3-Dichloropropene	ND	1.0	1	
Benzyl Chloride	ND	1.0	1		Ethylbenzene	ND	0.50	1	
Bromodichloromethane	ND	0.50	1		4-Ethyltoluene	ND	0.50	1	
Bromoform	ND	0.50	1		Hexachloro-1,3-Butadiene	ND	1.0	1	
Bromomethane	ND	0.50	1		2-Hexanone	ND	1.0	1	
2-Butanone	26	1	1		Methyl-t-Butyl Ether (MTBE)	ND	2.0	1	
Carbon Disulfide	3.0	0.5	1		Methylene Chloride	16	10	1	
Carbon Tetrachloride	ND	0.50	1		4-Methyl-2-Pentanone	ND	1.0	1	
Chlorobenzene	ND	0.50	1		o-Xylene	0.53	0.50	1	
Chloroethane	ND	0.50	1		p/m-Xylene	1.1	1.0	1	
Chloroform	2.6	0.5	1		Styrene	ND	1.0	1	
Chloromethane	0.58	0.50	1		Tetrachloroethene	1300	100	200	
Dibromochloromethane	ND	0.50	1		Toluene	2.4	0.5	1	
Dichlorodifluoromethane	0.71	0.50	1		Trichloroethene	3400	100	200	
1,1-Dichloroethane	9.3	0.5	1		Trichlorofluoromethane	ND	1.0	1	
1,1-Dichloroethene	1400	100	200		1,1,2-Trichloro-1,2,2-Trifluoroethane	2.4	1.0	1	
1,2-Dibromoethane	ND	0.50	1		1,1,1-Trichloroethane	150	10	20	
Dichlorotetrafluoroethane	ND	2.0	1		1,1,2-Trichloroethane	5.5	0.5	1	
1,2-Dichlorobenzene	ND	0.50	1		1,3,5-Trimethylbenzene	ND	0.50	1	
1,2-Dichloroethane	2.2	0.5	1		1,1,2,2-Tetrachloroethane	ND	1.0	1	
1,2-Dichloropropane	ND	0.50	1		1,2,4-Trimethylbenzene	1.1	1.0	1	
1,3-Dichlorobenzene	ND	0.50	1		1,2,4-Trichlorobenzene	ND	1.0	1	
1,4-Dichlorobenzene	ND	0.50	1		Vinyl Acetate	ND	1.0	1	
c-1,3-Dichloropropene	ND	0.50	1		Vinyl Chloride	ND	0.50	1	
c-1,2-Dichloroethene	2.9	0.5	1						
Surrogates:	REC (%)	Control Limits	Qual		Surrogates:	REC (%)	Control Limits	Qual	
1,4-Bromofluorobenzene	100	57-129			1,2-Dichloroethane-d4	90	47-137		
Toluene-d8	99	78-156							

RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

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OCVOCRWQCB004202

Analytical Report



Blasland, Bouck & Lee, Inc.
 2600 Michelson Drive, Suite 830
 Irvine, CA 92612-6520

Date Received: 10/25/06
 Work Order No: 06-10-1433
 Preparation: N/A
 Method: EPA TO-15
 Units: ppb (v/v)

Project: NGSC Former Y-12 Facility / 37134

Page 2 of 5

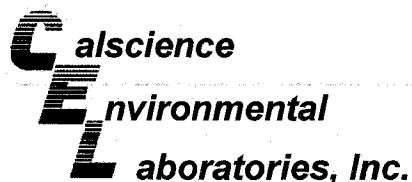
Client Sample Number	Lab Sample Number	Date Collected	Matrix	Date Prepared	Date Analyzed	QC Batch ID
Inlet-102506-B	06-10-1433-3	10/25/06	Air	N/A	10/26/06	061025L01

Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Acetone	19	2	1		t-1,2-Dichloroethene	0.67	0.50	1	
Benzene	0.66	0.50	1		t-1,3-Dichloropropene	ND	1.0	1	
Benzyl Chloride	ND	1.0	1		Ethylbenzene	ND	0.50	1	
Bromodichloromethane	ND	0.50	1		4-Ethyltoluene	ND	0.50	1	
Bromoform	ND	0.50	1		Hexachloro-1,3-Butadiene	ND	1.0	1	
Bromomethane	ND	0.50	1		2-Hexanone	ND	1.0	1	
2-Butanone	12	1	1		Methyl-t-Butyl Ether (MTBE)	ND	2.0	1	
Carbon Disulfide	3.4	0.5	1		Methylene Chloride	13	10	1	
Carbon Tetrachloride	ND	0.50	1		4-Methyl-2-Pentanone	ND	1.0	1	
Chlorobenzene	ND	0.50	1		o-Xylene	0.52	0.50	1	
Chloroethane	ND	0.50	1		p/m-Xylene	1.3	1.0	1	
Chloroform	1.1	0.5	1		Styrene	ND	1.0	1	
Chloromethane	0.57	0.50	1		Tetrachloroethene	590	20	40	
Dibromochloromethane	ND	0.50	1		Toluene	2.6	0.5	1	
Dichlorodifluoromethane	0.55	0.50	1		Trichloroethene	1700	20	40	
1,1-Dichloroethane	3.6	0.5	1		Trichlorofluoromethane	ND	1.0	1	
1,1-Dichloroethene	1400	20	40		1,1,2-Trichloro-1,2,2-Trifluoroethane	1.1	1.0	1	
1,2-Dibromoethane	ND	0.50	1		1,1,1-Trichloroethane	40	0.50	1	
Dichlorotetrafluoroethane	ND	2.0	1		1,1,2-Trichloroethane	1.6	0.5	1	
1,2-Dichlorobenzene	ND	0.50	1		1,3,5-Trimethylbenzene	ND	0.50	1	
1,2-Dichloroethane	0.65	0.50	1		1,1,2,2-Tetrachloroethane	ND	1.0	1	
1,2-Dichloropropane	ND	0.50	1		1,2,4-Trimethylbenzene	ND	1.0	1	
1,3-Dichlorobenzene	ND	0.50	1		1,2,4-Trichlorobenzene	ND	1.0	1	
1,4-Dichlorobenzene	ND	0.50	1		Vinyl Acetate	ND	1.0	1	
c-1,3-Dichloropropene	ND	0.50	1		Vinyl Chloride	ND	0.50	1	
c-1,2-Dichloroethene	0.99	0.50	1						
<u>Surrogates:</u>	<u>REC (%)</u>	<u>Control Limits</u>		<u>Qual</u>	<u>Surrogates:</u>	<u>REC (%)</u>	<u>Control Limits</u>		<u>Qual</u>
1,4-Bromofluorobenzene	104	57-129			1,2-Dichloroethane-d4	76	47-137		
Toluene-d8	97	78-156							

RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

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OCVOCRWQCB004203



Analytical Report



Blasland, Bouck & Lee, Inc.
2600 Michelson Drive, Suite 830
Irvine, CA 92612-6520

Date Received: 10/25/06
Work Order No: 06-10-1433
Preparation: N/A
Method: EPA TO-15
Units: ppb (v/v)

Project: NGSC Former Y-12 Facility / 37134

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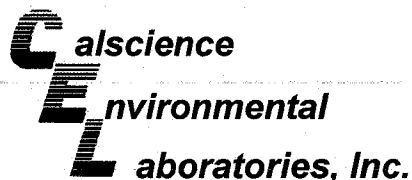
Client Sample Number	Lab Sample Number	Date Collected	Matrix	Date Prepared	Date Analyzed	QC Batch ID
Inlet-102506-C	06-10-1433-4	10/25/06	Air	N/A	10/26/06	061025L01

Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Acetone	15	2	1		t-1,2-Dichloroethene	1.6	0.5	1	
Benzene	0.71	0.50	1		t-1,3-Dichloropropene	ND	1.0	1	
Benzyl Chloride	ND	1.0	1		Ethylbenzene	ND	0.50	1	
Bromodichloromethane	ND	0.50	1		4-Ethyltoluene	ND	0.50	1	
Bromoform	ND	0.50	1		Hexachloro-1,3-Butadiene	ND	1.0	1	
Bromomethane	ND	0.50	1		2-Hexanone	ND	1.0	1	
2-Butanone	7.7	1.0	1		Methyl-t-Butyl Ether (MTBE)	ND	2.0	1	
Carbon Disulfide	3.3	0.5	1		Methylene Chloride	12	10	1	
Carbon Tetrachloride	ND	0.50	1		4-Methyl-2-Pentanone	ND	1.0	1	
Chlorobenzene	ND	0.50	1		o-Xylene	ND	0.50	1	
Chloroethane	ND	0.50	1		p/m-Xylene	ND	1.0	1	
Chloroform	0.81	0.50	1		Styrene	ND	1.0	1	
Chloromethane	0.58	0.50	1		Tetrachloroethene	260	100	200	
Dibromochloromethane	ND	0.50	1		Toluene	1.8	0.5	1	
Dichlorodifluoromethane	0.53	0.50	1		Trichloroethene	1700	100	200	
1,1-Dichloroethane	3.3	0.5	1		Trichlorofluoromethane	ND	1.0	1	
1,1-Dichloroethene	1300	100	200		1,1,2-Trichloro-1,2,2-Trifluoroethane	ND	1.0	1	
1,2-Dibromoethane	ND	0.50	1		1,1,1-Trichloroethane	29	0.50	1	
Dichlorotetrafluoroethane	ND	2.0	1		1,1,2-Trichloroethane	1.2	0.5	1	
1,2-Dichlorobenzene	ND	0.50	1		1,3,5-Trimethylbenzene	ND	0.50	1	
1,2-Dichloroethane	ND	0.50	1		1,1,2,2-Tetrachloroethane	ND	1.0	1	
1,2-Dichloropropane	ND	0.50	1		1,2,4-Trimethylbenzene	ND	1.0	1	
1,3-Dichlorobenzene	ND	0.50	1		1,2,4-Trichlorobenzene	ND	1.0	1	
1,4-Dichlorobenzene	ND	0.50	1		Vinyl Acetate	ND	1.0	1	
c-1,3-Dichloropropene	ND	0.50	1		Vinyl Chloride	0.85	0.50	1	
c-1,2-Dichloroethene	1.3	0.5	1						
Surrogates:	REC (%)	Control Limits	Qual		Surrogates:	REC (%)	Control Limits	Qual	
1,4-Bromofluorobenzene	102	57-129			1,2-Dichloroethane-d4	74	47-137		
Toluene-d8	100	78-156							

RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

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OCVOCRWQCB004204



Analytical Report



Blasland, Bouck & Lee, Inc.
2600 Michelson Drive, Suite 830
Irvine, CA 92612-6520

Date Received: 10/25/06
Work Order No: 06-10-1433
Preparation: N/A
Method: EPA TO-15
Units: ppb (v/v)

Project: NGSC Former Y-12 Facility / 37134

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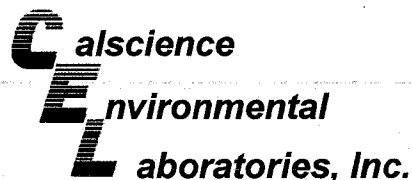
Client Sample Number	Lab Sample Number	Date Collected	Matrix	Date Prepared	Date Analyzed	QC Batch ID
Method Blank	095-01-021-4,286	N/A	Air	N/A	10/25/06	061025L01

Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Acetone	ND	2.0	1		t-1,2-Dichloroethene	ND	0.50	1	
Benzene	ND	0.50	1		t-1,3-Dichloropropene	ND	1.0	1	
Benzyl Chloride	ND	1.0	1		Ethylbenzene	ND	0.50	1	
Bromodichloromethane	ND	0.50	1		4-Ethyltoluene	ND	0.50	1	
Bromoform	ND	0.50	1		Hexachloro-1,3-Butadiene	ND	1.0	1	
Bromomethane	ND	0.50	1		2-Hexanone	ND	1.0	1	
2-Butanone	ND	1.0	1		Methyl-t-Butyl Ether (MTBE)	ND	2.0	1	
Carbon Disulfide	ND	0.50	1		Methylene Chloride	ND	10	1	
Carbon Tetrachloride	ND	0.50	1		4-Methyl-2-Pentanone	ND	1.0	1	
Chlorobenzene	ND	0.50	1		o-Xylene	ND	0.50	1	
Chloroethane	ND	0.50	1		p/m-Xylene	ND	1.0	1	
Chloroform	ND	0.50	1		Styrene	ND	1.0	1	
Chloromethane	ND	0.50	1		Tetrachloroethene	ND	0.50	1	
Dibromochloromethane	ND	0.50	1		Toluene	ND	0.50	1	
Dichlorodifluoromethane	ND	0.50	1		Trichloroethene	ND	0.50	1	
1,1-Dichloroethane	ND	0.50	1		Trichlorofluoromethane	ND	1.0	1	
1,1-Dichloroethene	ND	0.50	1		1,1,2-Trichloro-1,2,2-Trifluoroethane	ND	1.0	1	
1,2-Dibromoethane	ND	0.50	1		1,1,1-Trichloroethane	ND	0.50	1	
Dichlorotetrafluoroethane	ND	2.0	1		1,1,2-Trichloroethane	ND	0.50	1	
1,2-Dichlorobenzene	ND	0.50	1		1,3,5-Trimethylbenzene	ND	0.50	1	
1,2-Dichloroethane	ND	0.50	1		1,1,2,2-Tetrachloroethane	ND	1.0	1	
1,2-Dichloropropane	ND	0.50	1		1,2,4-Trimethylbenzene	ND	1.0	1	
1,3-Dichlorobenzene	ND	0.50	1		1,2,4-Trichlorobenzene	ND	1.0	1	
1,4-Dichlorobenzene	ND	0.50	1		Vinyl Acetate	ND	1.0	1	
c-1,3-Dichloropropene	ND	0.50	1		Vinyl Chloride	ND	0.50	1	
c-1,2-Dichloroethene	ND	0.50	1						
Surrogates:	REC (%)	Control Limits		Qual	Surrogates:	REC (%)	Control Limits		Qual
1,4-Bromofluorobenzene	98	57-129			1,2-Dichloroethane-d4	76	47-137		
Toluene-d8	95	78-156							

RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

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OCVOCRWQCB004205



Analytical Report



Blasland, Bouck & Lee, Inc.
2600 Michelson Drive, Suite 830
Irvine, CA 92612-6520

Date Received: 10/25/06
Work Order No: 06-10-1433
Preparation: N/A
Method: EPA TO-15
Units: ppb (v/v)

Project: NGSC Former Y-12 Facility / 37134

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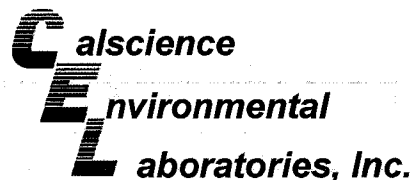
Client Sample Number	Lab Sample Number	Date Collected	Matrix	Date Prepared	Date Analyzed	QC Batch ID
Method Blank	095-01-021-4,291	N/A	Air	N/A	10/26/06	061026L01

Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Acetone	ND	2.0	1		t-1,2-Dichloroethene	ND	0.50	1	
Benzene	ND	0.50	1		t-1,3-Dichloropropene	ND	1.0	1	
Benzyl Chloride	ND	1.0	1		Ethylbenzene	ND	0.50	1	
Bromodichloromethane	ND	0.50	1		4-Ethyltoluene	ND	0.50	1	
Bromoform	ND	0.50	1		Hexachloro-1,3-Butadiene	ND	1.0	1	
Bromomethane	ND	0.50	1		2-Hexanone	ND	1.0	1	
2-Butanone	ND	1.0	1		Methyl-t-Butyl Ether (MTBE)	ND	2.0	1	
Carbon Disulfide	ND	0.50	1		Methylene Chloride	ND	10	1	
Carbon Tetrachloride	ND	0.50	1		4-Methyl-2-Pentanone	ND	1.0	1	
Chlorobenzene	ND	0.50	1		o-Xylene	ND	0.50	1	
Chloroethane	ND	0.50	1		p/m-Xylene	ND	1.0	1	
Chloroform	ND	0.50	1		Styrene	ND	1.0	1	
Chloromethane	ND	0.50	1		Tetrachloroethene	ND	0.50	1	
Dibromochloromethane	ND	0.50	1		Toluene	ND	0.50	1	
Dichlorodifluoromethane	ND	0.50	1		Trichloroethene	ND	0.50	1	
1,1-Dichloroethane	ND	0.50	1		Trichlorofluoromethane	ND	1.0	1	
1,1-Dichloroethene	ND	0.50	1		1,1,2-Trichloro-1,2,2-Trifluoroethane	ND	1.0	1	
1,2-Dibromoethane	ND	0.50	1		1,1,1-Trichloroethane	ND	0.50	1	
Dichlorotetrafluoroethane	ND	2.0	1		1,1,2-Trichloroethane	ND	0.50	1	
1,2-Dichlorobenzene	ND	0.50	1		1,3,5-Trimethylbenzene	ND	0.50	1	
1,2-Dichloroethane	ND	0.50	1		1,1,2,2-Tetrachloroethane	ND	1.0	1	
1,2-Dichloropropane	ND	0.50	1		1,2,4-Trimethylbenzene	ND	1.0	1	
1,3-Dichlorobenzene	ND	0.50	1		1,2,4-Trichlorobenzene	ND	1.0	1	
1,4-Dichlorobenzene	ND	0.50	1		Vinyl Acetate	ND	1.0	1	
c-1,3-Dichloropropene	ND	0.50	1		Vinyl Chloride	ND	0.50	1	
c-1,2-Dichloroethene	ND	0.50	1						
Surrogates:	REC (%)	Control Limits		Qual	Surrogates:	REC (%)	Control Limits		Qual
1,4-Bromofluorobenzene	102	57-129			1,2-Dichloroethane-d4	102	47-137		
Toluene-d8	94	78-156							

RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

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OCVOCRWQCB004206



Analytical Report



Blasland, Bouck & Lee, Inc.
2600 Michelson Drive, Suite 830
Irvine, CA 92612-6520

Date Received: 10/25/06
Work Order No: 06-10-1433
Preparation: EPA 5030B
Method: EPA 8260B
Units: ug/L

Project: NGSC Former Y-12 Facility / 37134

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Client Sample Number	Lab Sample Number	Date Collected	Matrix	Date Prepared	Date Analyzed	QC Batch ID
TB-102506	06-10-1433-1	10/25/06	Aqueous	10/26/06	10/27/06	061028L02

Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Acetone	ND	50	1		1,3-Dichloropropane	ND	1.0	1	
Benzene	ND	0.50	1		2,2-Dichloropropane	ND	1.0	1	
Bromobenzene	ND	1.0	1		1,1-Dichloropropene	ND	1.0	1	
Bromochloromethane	ND	1.0	1		c-1,3-Dichloropropene	ND	0.50	1	
Bromodichloromethane	ND	1.0	1		t-1,3-Dichloropropene	ND	0.50	1	
Bromoform	ND	1.0	1		Ethylbenzene	ND	1.0	1	
Bromomethane	ND	10	1		2-Hexanone	ND	10	1	
2-Butanone	ND	10	1		Isopropylbenzene	ND	1.0	1	
n-Butylbenzene	ND	1.0	1		p-Isopropyltoluene	ND	1.0	1	
sec-Butylbenzene	ND	1.0	1		Methylene Chloride	ND	10	1	
tert-Butylbenzene	ND	1.0	1		4-Methyl-2-Pentanone	ND	10	1	
Carbon Disulfide	ND	10	1		Naphthalene	ND	10	1	
Carbon Tetrachloride	ND	0.50	1		n-Propylbenzene	ND	1.0	1	
Chlorobenzene	ND	1.0	1		Styrene	ND	1.0	1	
Chloroethane	ND	1.0	1		1,1,1,2-Tetrachloroethane	ND	1.0	1	
Chloroform	ND	1.0	1		1,1,2,2-Tetrachloroethane	ND	1.0	1	
Chloromethane	ND	10	1		Tetrachloroethene	ND	1.0	1	
2-Chlorotoluene	ND	1.0	1		Toluene	ND	1.0	1	
4-Chlorotoluene	ND	1.0	1		1,2,3-Trichlorobenzene	ND	1.0	1	
Dibromochloromethane	ND	1.0	1		1,2,4-Trichlorobenzene	ND	1.0	1	
1,2-Dibromo-3-Chloropropane	ND	5.0	1		1,1,1-Trichloroethane	ND	1.0	1	
1,2-Dibromoethane	ND	1.0	1		1,1,2-Trichloro-1,2,2-Trifluoroethane	ND	10	1	
Dibromomethane	ND	1.0	1		1,1,2-Trichloroethane	ND	1.0	1	
1,2-Dichlorobenzene	ND	1.0	1		Trichloroethene	ND	1.0	1	
1,3-Dichlorobenzene	ND	1.0	1		Trichlorofluoromethane	ND	10	1	
1,4-Dichlorobenzene	ND	1.0	1		1,2,3-Trichloropropane	ND	5.0	1	
Dichlorodifluoromethane	ND	1.0	1		1,2,4-Trimethylbenzene	ND	1.0	1	
1,1-Dichloroethane	ND	1.0	1		1,3,5-Trimethylbenzene	ND	1.0	1	
1,2-Dichloroethane	ND	0.50	1		Vinyl Acetate	ND	10	1	
1,1-Dichloroethene	ND	1.0	1		Vinyl Chloride	ND	0.50	1	
c-1,2-Dichloroethene	ND	1.0	1		p/m-Xylene	ND	1.0	1	
t-1,2-Dichloroethene	ND	1.0	1		o-Xylene	ND	1.0	1	
1,2-Dichloropropane	ND	1.0	1		Methyl-t-Butyl Ether (MTBE)	ND	1.0	1	
Surrogates:	REC (%)	Control Limits		Qual	Surrogates:	REC (%)	Control Limits		Qual
Dibromofluoromethane	107	74-140			1,2-Dichloroethane-d4	115	74-146		
Toluene-d8	95	88-112			1,4-Bromofluorobenzene	88	74-110		

RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

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OCVOCRWQCB004207



Analytical Report



Blasland, Bouck & Lee, Inc.
2600 Michelson Drive, Suite 830
Irvine, CA 92612-6520

Date Received: 10/25/06
Work Order No: 06-10-1433
Preparation: EPA 5030B
Method: EPA 8260B
Units: ug/L

Project: NGSC Former Y-12 Facility / 37134

Page 2 of 4

Client Sample Number	Lab Sample Number	Date Collected	Matrix	Date Prepared	Date Analyzed	QC Batch ID
GW-102506	06-10-1433-5	10/25/06	Aqueous	10/27/06	10/27/06	061027L01

Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Acetone	ND	50	1		1,3-Dichloropropane	ND	1.0	1	
Benzene	ND	0.50	1		2,2-Dichloropropane	ND	1.0	1	
Bromobenzene	ND	1.0	1		1,1-Dichloropropene	ND	1.0	1	
Bromochloromethane	ND	1.0	1		c-1,3-Dichloropropene	ND	0.50	1	
Bromodichloromethane	ND	1.0	1		t-1,3-Dichloropropene	ND	0.50	1	
Bromoform	ND	1.0	1		Ethylbenzene	ND	1.0	1	
Bromomethane	ND	10	1		2-Hexanone	ND	10	1	
2-Butanone	ND	10	1		Isopropylbenzene	ND	1.0	1	
n-Butylbenzene	ND	1.0	1		p-Isopropyltoluene	ND	1.0	1	
sec-Butylbenzene	ND	1.0	1		Methylene Chloride	ND	10	1	
tert-Butylbenzene	ND	1.0	1		4-Methyl-2-Pentanone	ND	10	1	
Carbon Disulfide	ND	10	1		Naphthalene	ND	10	1	
Carbon Tetrachloride	ND	0.50	1		n-Propylbenzene	ND	1.0	1	
Chlorobenzene	ND	1.0	1		Styrene	ND	1.0	1	
Chloroethane	ND	1.0	1		1,1,1,2-Tetrachloroethane	ND	1.0	1	
Chloroform	ND	1.0	1		1,1,2,2-Tetrachloroethane	ND	1.0	1	
Chloromethane	ND	10	1		Tetrachloroethene	1.1	1.0	1	
2-Chlorotoluene	ND	1.0	1		Toluene	ND	1.0	1	
4-Chlorotoluene	ND	1.0	1		1,2,3-Trichlorobenzene	ND	1.0	1	
Dibromochloromethane	ND	1.0	1		1,2,4-Trichlorobenzene	ND	1.0	1	
1,2-Dibromo-3-Chloropropane	ND	5.0	1		1,1,1-Trichloroethane	ND	1.0	1	
1,2-Dibromoethane	ND	1.0	1		1,1,2-Trichloro-1,2,2-Trifluoroethane	ND	10	1	
Dibromomethane	ND	1.0	1		1,1,2-Trichloroethane	ND	1.0	1	
1,2-Dichlorobenzene	ND	1.0	1		Trichloroethene	6.6	1.0	1	
1,3-Dichlorobenzene	ND	1.0	1		Trichlorofluoromethane	ND	10	1	
1,4-Dichlorobenzene	ND	1.0	1		1,2,3-Trichloropropane	ND	5.0	1	
Dichlorodifluoromethane	ND	1.0	1		1,2,4-Trimethylbenzene	ND	1.0	1	
1,1-Dichloroethane	ND	1.0	1		1,3,5-Trimethylbenzene	ND	1.0	1	
1,2-Dichloroethane	ND	0.50	1		Vinyl Acetate	ND	10	1	
1,1-Dichloroethene	1.4	1.0	1		Vinyl Chloride	ND	0.50	1	
c-1,2-Dichloroethene	ND	1.0	1		p/m-Xylene	ND	1.0	1	
t-1,2-Dichloroethene	ND	1.0	1		o-Xylene	ND	1.0	1	
1,2-Dichloropropane	ND	1.0	1		Methyl-t-Butyl Ether (MTBE)	ND	1.0	1	
Surrogates:	REC (%)	Control Limits	Qual		Surrogates:	REC (%)	Control Limits	Qual	
Dibromofluoromethane	103	74-140			1,2-Dichloroethane-d4	106	74-146		
Toluene-d8	94	88-112			1,4-Bromofluorobenzene	87	74-110		

RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

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OCVOCRWQCB004208

Analytical Report



Blasland, Bouck & Lee, Inc.
 2600 Michelson Drive, Suite 830
 Irvine, CA 92612-6520

Date Received: 10/25/06
 Work Order No: 06-10-1433
 Preparation: EPA 5030B
 Method: EPA 8260B
 Units: ug/L

Project: NGSC Former Y-12 Facility / 37134

Page 3 of 4

Client Sample Number	Lab Sample Number	Date Collected	Matrix	Date Prepared	Date Analyzed	QC Batch ID
Method Blank	099-10-006-19,444	N/A	Aqueous	10/26/06	10/27/06	061026L02

Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Acetone	ND	50	1		1,3-Dichloropropane	ND	1.0	1	
Benzene	ND	0.50	1		2,2-Dichloropropane	ND	1.0	1	
Bromobenzene	ND	1.0	1		1,1-Dichloropropene	ND	1.0	1	
Bromochloromethane	ND	1.0	1		c-1,3-Dichloropropene	ND	0.50	1	
Bromodichloromethane	ND	1.0	1		t-1,3-Dichloropropene	ND	0.50	1	
Bromoform	ND	1.0	1		Ethylbenzene	ND	1.0	1	
Bromomethane	ND	10	1		2-Hexanone	ND	10	1	
2-Butanone	ND	10	1		Isopropylbenzene	ND	1.0	1	
n-Butylbenzene	ND	1.0	1		p-Isopropyltoluene	ND	1.0	1	
sec-Butylbenzene	ND	1.0	1		Methylene Chloride	ND	10	1	
tert-Butylbenzene	ND	1.0	1		4-Methyl-2-Pentanone	ND	10	1	
Carbon Disulfide	ND	10	1		Naphthalene	ND	10	1	
Carbon Tetrachloride	ND	0.50	1		n-Propylbenzene	ND	1.0	1	
Chlorobenzene	ND	1.0	1		Styrene	ND	1.0	1	
Chloroethane	ND	1.0	1		1,1,1,2-Tetrachloroethane	ND	1.0	1	
Chloroform	ND	1.0	1		1,1,2,2-Tetrachloroethane	ND	1.0	1	
Chloromethane	ND	10	1		Tetrachloroethene	ND	1.0	1	
2-Chlorotoluene	ND	1.0	1		Toluene	ND	1.0	1	
4-Chlorotoluene	ND	1.0	1		1,2,3-Trichlorobenzene	ND	1.0	1	
Dibromochloromethane	ND	1.0	1		1,2,4-Trichlorobenzene	ND	1.0	1	
1,2-Dibromo-3-Chloropropane	ND	5.0	1		1,1,1-Trichloroethane	ND	1.0	1	
1,2-Dibromoethane	ND	1.0	1		1,1,2-Trichloro-1,2,2-Trifluoroethane	ND	10	1	
Dibromomethane	ND	1.0	1		1,1,2-Trichloroethane	ND	1.0	1	
1,2-Dichlorobenzene	ND	1.0	1		Trichloroethene	ND	1.0	1	
1,3-Dichlorobenzene	ND	1.0	1		Trichlorofluoromethane	ND	10	1	
1,4-Dichlorobenzene	ND	1.0	1		1,2,3-Trichloropropane	ND	5.0	1	
Dichlorodifluoromethane	ND	1.0	1		1,2,4-Trimethylbenzene	ND	1.0	1	
1,1-Dichloroethane	ND	1.0	1		1,3,5-Trimethylbenzene	ND	1.0	1	
1,2-Dichloroethane	ND	0.50	1		Vinyl Acetate	ND	10	1	
1,1-Dichloroethene	ND	1.0	1		Vinyl Chloride	ND	0.50	1	
c-1,2-Dichloroethene	ND	1.0	1		p/m-Xylene	ND	1.0	1	
t-1,2-Dichloroethene	ND	1.0	1		o-Xylene	ND	1.0	1	
1,2-Dichloropropane	ND	1.0	1		Methyl-t-Butyl Ether (MTBE)	ND	1.0	1	
Surrogates:	REC (%)	Control Limits		Qual	Surrogates:	REC (%)	Control Limits		Qual
Dibromofluoromethane	104	74-140			1,2-Dichloroethane-d4	109	74-146		
Toluene-d8	94	88-112			1,4-Bromofluorobenzene	88	74-110		

RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

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OCVOCRWQCB004209

Analytical Report



Blasland, Bouck & Lee, Inc.
 2600 Michelson Drive, Suite 830
 Irvine, CA 92612-6520

Date Received: 10/25/06
 Work Order No: 06-10-1433
 Preparation: EPA 5030B
 Method: EPA 8260B
 Units: ug/L

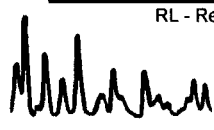
Project: NGSC Former Y-12 Facility / 37134

Page 4 of 4

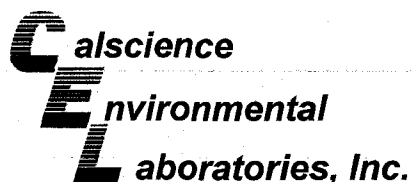
Client Sample Number	Lab Sample Number	Date Collected	Matrix	Date Prepared	Date Analyzed	QC Batch ID
Method Blank	099-10-006-19,448	N/A	Aqueous	10/27/06	10/27/06	061027L01

Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Acetone	ND	50	1		1,3-Dichloropropane	ND	1.0	1	
Benzene	ND	0.50	1		2,2-Dichloropropane	ND	1.0	1	
Bromobenzene	ND	1.0	1		1,1-Dichloropropene	ND	1.0	1	
Bromochloromethane	ND	1.0	1		c-1,3-Dichloropropene	ND	0.50	1	
Bromodichloromethane	ND	1.0	1		t-1,3-Dichloropropene	ND	0.50	1	
Bromoform	ND	1.0	1		Ethylbenzene	ND	1.0	1	
Bromomethane	ND	10	1		2-Hexanone	ND	10	1	
2-Butanone	ND	10	1		Isopropylbenzene	ND	1.0	1	
n-Butylbenzene	ND	1.0	1		p-Isopropyltoluene	ND	1.0	1	
sec-Butylbenzene	ND	1.0	1		Methylene Chloride	ND	10	1	
tert-Butylbenzene	ND	1.0	1		4-Methyl-2-Pentanone	ND	10	1	
Carbon Disulfide	ND	10	1		Naphthalene	ND	10	1	
Carbon Tetrachloride	ND	0.50	1		n-Propylbenzene	ND	1.0	1	
Chlorobenzene	ND	1.0	1		Styrene	ND	1.0	1	
Chloroethane	ND	1.0	1		1,1,1,2-Tetrachloroethane	ND	1.0	1	
Chloroform	ND	1.0	1		1,1,2,2-Tetrachloroethane	ND	1.0	1	
Chloromethane	ND	10	1		Tetrachloroethene	ND	1.0	1	
2-Chlorotoluene	ND	1.0	1		Toluene	ND	1.0	1	
4-Chlorotoluene	ND	1.0	1		1,2,3-Trichlorobenzene	ND	1.0	1	
Dibromochloromethane	ND	1.0	1		1,2,4-Trichlorobenzene	ND	1.0	1	
1,2-Dibromo-3-Chloropropane	ND	5.0	1		1,1,1-Trichloroethane	ND	1.0	1	
1,2-Dibromoethane	ND	1.0	1		1,1,2-Trichloro-1,2,2-Trifluoroethane	ND	10	1	
Dibromomethane	ND	1.0	1		1,1,2-Trichloroethane	ND	1.0	1	
1,2-Dichlorobenzene	ND	1.0	1		Trichloroethene	ND	1.0	1	
1,3-Dichlorobenzene	ND	1.0	1		Trichlorofluoromethane	ND	10	1	
1,4-Dichlorobenzene	ND	1.0	1		1,2,3-Trichloropropane	ND	5.0	1	
Dichlorodifluoromethane	ND	1.0	1		1,2,4-Trimethylbenzene	ND	1.0	1	
1,1-Dichloroethane	ND	1.0	1		1,3,5-Trimethylbenzene	ND	1.0	1	
1,2-Dichloroethane	ND	0.50	1		Vinyl Acetate	ND	10	1	
1,1-Dichloroethene	ND	1.0	1		Vinyl Chloride	ND	0.50	1	
c-1,2-Dichloroethene	ND	1.0	1		p/m-Xylene	ND	1.0	1	
t-1,2-Dichloroethene	ND	1.0	1		o-Xylene	ND	1.0	1	
1,2-Dichloropropane	ND	1.0	1		Methyl-t-Butyl Ether (MTBE)	ND	1.0	1	
Surrogates:	REC (%)	Control Limits		Qual	Surrogates:	REC (%)	Control Limits		Qual
Dibromofluoromethane	101	74-140			1,2-Dichloroethane-d4	107	74-146		
Toluene-d8	94	88-112			1,4-Bromofluorobenzene	89	74-110		

RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers


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OCVOCRWQCB004210



Quality Control - Spike/Spike Duplicate



Blasland, Bouck & Lee, Inc.
2600 Michelson Drive, Suite 830
Irvine, CA 92612-6520

Date Received: 10/25/06
Work Order No: 06-10-1433
Preparation: EPA 5030B
Method: EPA 8260B

Project NGSC Former Y-12 Facility / 37134

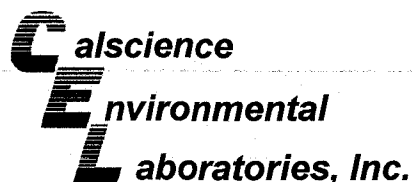
Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
06-10-1487-4	Aqueous	GC/MS T	10/26/06	10/27/06	061026S02

Parameter	MS %REC	MSD %REC	%REC CL	RPD	RPD CL	Qualifiers
Benzene	98	97	88-118	2	0-7	
Carbon Tetrachloride	106	107	67-145	1	0-11	
Chlorobenzene	97	96	88-118	1	0-7	
1,2-Dichlorobenzene	100	99	86-116	1	0-8	
1,1-Dichloroethene	98	100	70-130	1	0-25	
Toluene	98	96	87-123	1	0-8	
Trichloroethene	96	96	79-127	0	0-10	
Vinyl Chloride	89	95	69-129	6	0-13	
Methyl-t-Butyl Ether (MTBE)	101	102	71-131	2	0-13	
Tert-Butyl Alcohol (TBA)	108	110	36-168	2	0-45	
Diisopropyl Ether (DIPE)	98	101	81-123	3	0-9	
Ethyl-t-Butyl Ether (ETBE)	98	101	72-126	3	0-12	
Tert-Amyl-Methyl Ether (TAME)	97	97	72-126	0	0-12	
Ethanol	106	104	53-149	2	0-31	

RPD - Relative Percent Difference, CL - Control Limit

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OCVOCRWQCB004211



Quality Control - Spike/Spike Duplicate



Blasland, Bouck & Lee, Inc.
2600 Michelson Drive, Suite 830
Irvine, CA 92612-6520

Date Received: 10/25/06
Work Order No: 06-10-1433
Preparation: EPA 5030B
Method: EPA 8260B

Project NGSC Former Y-12 Facility / 37134

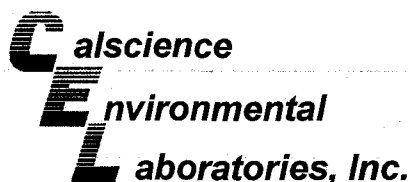
Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
GW-102506	Aqueous	GC/MS T	10/27/06	10/27/06	061027S01

Parameter	MS %REC	MSD %REC	%REC CL	RPD	RPD CL	Qualifiers
Benzene	96	97	88-118	1	0-7	
Carbon Tetrachloride	106	104	67-145	1	0-11	
Chlorobenzene	98	97	88-118	1	0-7	
1,2-Dichlorobenzene	99	102	86-116	3	0-8	
1,1-Dichloroethene	100	99	70-130	1	0-25	
Toluene	97	98	87-123	1	0-8	
Trichloroethene	97	95	79-127	2	0-10	
Vinyl Chloride	91	94	69-129	4	0-13	
Methyl-t-Butyl Ether (MTBE)	103	105	71-131	2	0-13	
Tert-Butyl Alcohol (TBA)	115	121	36-168	5	0-45	
Diisopropyl Ether (DIPE)	100	100	81-123	0	0-9	
Ethyl-t-Butyl Ether (ETBE)	101	104	72-126	3	0-12	
Tert-Amyl-Methyl Ether (TAME)	98	102	72-126	4	0-12	
Ethanol	104	111	53-149	6	0-31	

RPD - Relative Percent Difference, CL - Control Limit

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OCVOCRWQCB004212



Quality Control - LCS/LCS Duplicate



Blasland, Bouck & Lee, Inc.
2600 Michelson Drive, Suite 830
Irvine, CA 92612-6520

Date Received: N/A
Work Order No: 06-10-1433
Preparation: N/A
Method: EPA TO-15

Project: NGSC Former Y-12 Facility / 37134

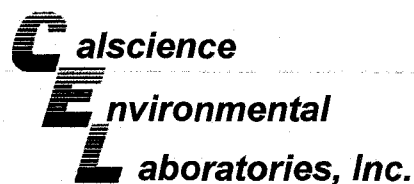
Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number
095-01-021-4,286	Air	GC/MS DD	N/A	10/25/06	061025L01

Parameter	LCS %REC	LCSD %REC	%REC CL	RPD	RPD CL	Qualifiers
Benzene	113	111	60-156	1	0-40	
Carbon Tetrachloride	111	110	64-154	0	0-32	
1,2-Dibromoethane	99	97	54-144	1	0-36	
1,2-Dichlorobenzene	102	101	34-160	1	0-47	
1,2-Dichloroethane	78	103	69-153	28	0-30	
1,2-Dichloropropane	101	102	67-157	1	0-35	
1,4-Dichlorobenzene	97	95	36-156	2	0-47	
c-1,3-Dichloropropene	110	109	61-157	1	0-35	
Ethylbenzene	112	113	52-154	0	0-38	
o-Xylene	109	109	52-148	0	0-38	
p/m-Xylene	100	100	42-156	1	0-41	
Tetrachloroethene	104	103	56-152	1	0-40	
Toluene	105	105	56-146	0	0-43	
Trichloroethene	118	119	63-159	0	0-34	
1,1,2-Trichloroethane	99	99	65-149	0	0-37	
Vinyl Chloride	84	111	45-177	29	0-36	

RPD - Relative Percent Difference, CL - Control Limit

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OCVOCRWQCB004213



Quality Control - LCS/LCS Duplicate



Blasland, Bouck & Lee, Inc.
2600 Michelson Drive, Suite 830
Irvine, CA 92612-6520

Date Received: N/A
Work Order No: 06-10-1433
Preparation: N/A
Method: EPA TO-15

Project: NGSC Former Y-12 Facility / 37134

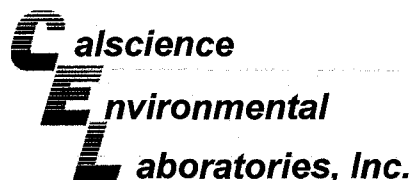
Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number
095-01-021-4,291	Air	GC/MS DD	N/A	10/26/06	061026L01

Parameter	LCS %REC	LCSD %REC	%REC CL	RPD	RPD CL	Qualifiers
Benzene	109	111	60-156	2	0-40	
Carbon Tetrachloride	108	111	64-154	3	0-32	
1,2-Dibromoethane	98	99	54-144	1	0-36	
1,2-Dichlorobenzene	100	101	34-160	1	0-47	
1,2-Dichloroethane	85	104	69-153	20	0-30	
1,2-Dichloropropane	100	101	67-157	0	0-35	
1,4-Dichlorobenzene	96	95	36-156	1	0-47	
c-1,3-Dichloropropene	107	109	61-157	2	0-35	
Ethylbenzene	112	113	52-154	1	0-38	
o-Xylene	109	111	52-148	2	0-38	
p/m-Xylene	101	102	42-156	1	0-41	
Tetrachloroethene	106	105	56-152	0	0-40	
Toluene	104	106	56-146	1	0-43	
Trichloroethene	118	119	63-159	0	0-34	
1,1,2-Trichloroethane	99	98	65-149	0	0-37	
Vinyl Chloride	83	113	45-177	30	0-36	

RPD - Relative Percent Difference, CL - Control Limit

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OCVOCRWQCB004214



Quality Control - LCS/LCS Duplicate



Blasland, Bouck & Lee, Inc.
2600 Michelson Drive, Suite 830
Irvine, CA 92612-6520

Date Received: N/A
Work Order No: 06-10-1433
Preparation: EPA 5030B
Method: EPA 8260B

Project: NGSC Former Y-12 Facility / 37134

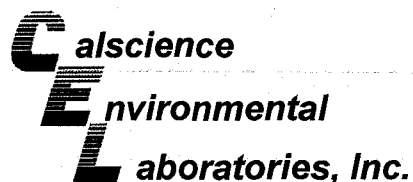
Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number
099-10-006-19,444	Aqueous	GC/MS T	10/26/06	10/26/06	061026L02

Parameter	LCS %REC	LCSD %REC	%REC CL	RPD	RPD CL	Qualifiers
Benzene	99	98	84-120	1	0-8	
Carbon Tetrachloride	105	103	63-147	2	0-10	
Chlorobenzene	98	95	89-119	3	0-7	
1,2-Dichlorobenzene	102	100	89-119	2	0-9	
1,1-Dichloroethene	100	100	77-125	1	0-16	
Toluene	98	98	83-125	1	0-9	
Trichloroethene	98	96	89-119	1	0-8	
Vinyl Chloride	92	95	63-135	3	0-13	
Methyl-t-Butyl Ether (MTBE)	103	105	82-118	1	0-13	
Tert-Butyl Alcohol (TBA)	104	108	46-154	4	0-32	
Diisopropyl Ether (DIPE)	101	103	81-123	2	0-11	
Ethyl-t-Butyl Ether (ETBE)	101	103	74-122	2	0-12	
Tert-Amyl-Methyl Ether (TAME)	101	102	76-124	1	0-10	
Ethanol	103	107	60-138	4	0-32	

RPD - Relative Percent Difference, CL - Control Limit

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OCVOCRWQCB004215



Quality Control - LCS/LCS Duplicate



Blasland, Bouck & Lee, Inc.
2600 Michelson Drive, Suite 830
Irvine, CA 92612-6520

Date Received: N/A
Work Order No: 06-10-1433
Preparation: EPA 5030B
Method: EPA 8260B

Project: NGSC Former Y-12 Facility / 37134

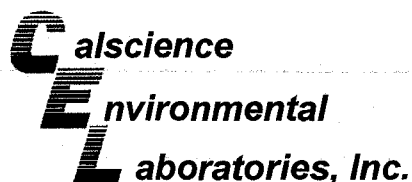
Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number
099-10-006-19,448	Aqueous	GC/MS T	10/27/06	10/27/06	061027L01

Parameter	LCS %REC	LCSD %REC	%REC CL	RPD	RPD CL	Qualifiers
Benzene	98	97	84-120	0	0-8	
Carbon Tetrachloride	108	104	63-147	4	0-10	
Chlorobenzene	98	96	89-119	2	0-7	
1,2-Dichlorobenzene	99	100	89-119	1	0-9	
1,1-Dichloroethene	102	99	77-125	2	0-16	
Toluene	99	98	83-125	0	0-9	
Trichloroethene	96	96	89-119	0	0-8	
Vinyl Chloride	95	92	63-135	3	0-13	
Methyl-t-Butyl Ether (MTBE)	106	104	82-118	2	0-13	
Tert-Butyl Alcohol (TBA)	115	113	46-154	2	0-32	
Diisopropyl Ether (DIPE)	103	101	81-123	2	0-11	
Ethyl-t-Butyl Ether (ETBE)	104	103	74-122	2	0-12	
Tert-Amyl-Methyl Ether (TAME)	102	100	76-124	2	0-10	
Ethanol	99	101	60-138	2	0-32	

RPD - Relative Percent Difference, CL - Control Limit

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OCVOCRWQCB004216



Glossary of Terms and Qualifiers



Work Order Number: 06-10-1433

<u>Qualifier</u>	<u>Definition</u>
*	See applicable analysis comment.
1	Surrogate compound recovery was out of control due to a required sample dilution, therefore, the sample data was reported without further clarification.
2	Surrogate compound recovery was out of control due to matrix interference. The associated method blank surrogate spike compound was in control and, therefore, the sample data was reported without further clarification.
3	Recovery of the Matrix Spike or Matrix Spike Duplicate compound was out of control due to matrix interference. The associated LCS and/or LCSD was in control and, therefore, the sample data was reported without further clarification.
4	The MS/MSD RPD was out of control due to matrix interference. The LCS/LCSD RPD was in control and, therefore, the sample data was reported without further clarification.
5	The PDS/PDSD associated with this batch of samples was out of control due to a matrix interference effect. The associated batch LCS/LCSD was in control and, hence, the associated sample data was reported with no further corrective action required.
A	Result is the average of all dilutions, as defined by the method.
B	Analyte was present in the associated method blank.
C	Analyte presence was not confirmed on primary column.
E	Concentration exceeds the calibration range.
H	Sample received and/or analyzed past the recommended holding time.
J	Analyte was detected at a concentration below the reporting limit and above the laboratory method detection limit. Reported value is estimated.
N	Nontarget Analyte.
ND	Parameter not detected at the indicated reporting limit.
Q	Spike recovery and RPD control limits do not apply resulting from the parameter concentration in the sample exceeding the spike concentration by a factor of four or greater.
U	Undetected at the laboratory method detection limit.
X	% Recovery and/or RPD out-of-range.
Z	Analyte presence was not confirmed by second column or GC/MS analysis.

CHAIN OF CUSTODY RECORD

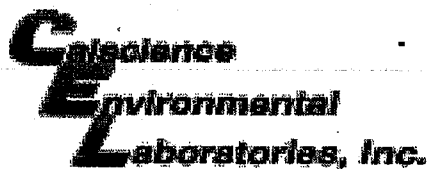
Date 10.25.06
Page 1 of 1

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Please note that pages 1 and 2 of 2 of our T/Cs are printed on the reverse side of the Green and Yellow copies respectively.

05/10/06 Revision

OCVOCR WQC B004218



WORK ORDER #: 06 - 10 - 1433

Cooler 1 of 1

SAMPLE RECEIPT FORM

CLIENT: BBLDATE: 10/25/6

TEMPERATURE – SAMPLES RECEIVED BY:

CALSCIENCE COURIER:

- ☐ Chilled, cooler with temperature blank provided.
- ☐ Chilled, cooler without temperature blank.
- ☒ Chilled and placed in cooler with wet ice.
- ☐ Ambient and placed in cooler with wet ice.
- ☐ Ambient temperature.

LABORATORY (Other than Calscience Courier):

- ☐ °C Temperature blank.
- ☐ °C IR thermometer.
- ☐ Ambient temperature.

3.7 °C Temperature blank.

Initial:

CUSTODY SEAL INTACT:

Sample(s): _____ Cooler: _____ No (Not Intact) : _____

Not Present: ☒

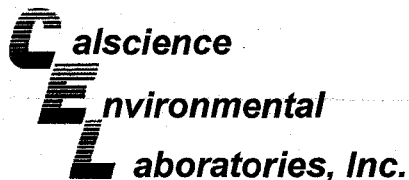
Initial:

SAMPLE CONDITION:

	Yes	No	N/A
Chain-Of-Custody document(s) received with samples.....	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sampler's name indicated on COC.....	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sample container label(s) consistent with custody papers.....	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sample container(s) intact and good condition.....	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Correct containers and volume for analyses requested.....	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Proper preservation noted on sample label(s).....	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
VOA vial(s) free of headspace.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tedlar bag(s) free of condensation.....	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Initial:

COMMENTS:



October 31, 2006

Steven Fry
Blasland, Bouck & Lee, Inc.
2600 Michelson Drive, Suite 830
Irvine, CA 92612-6520

Subject: **Calscience Work Order No.: 06-10-1520**
Client Reference: **NGSC Former Y-12 Facility / 37134**

Dear Client:

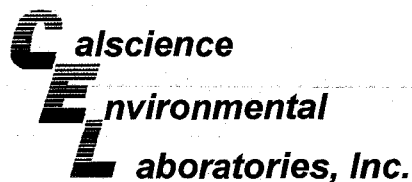
Enclosed is an analytical report for the above-referenced project. The samples included in this report were received 10/26/2006 and analyzed in accordance with the attached chain-of-custody.

Unless otherwise noted, all analytical testing was accomplished in accordance with the guidelines established in our Quality Systems Manual, applicable standard operating procedures, and other related documentation. The original report of subcontracted analysis, if any, is provided herein, and follows the standard Calscience data package. The results in this analytical report are limited to the samples tested and any reproduction thereof must be made in its entirety.

If you have any questions regarding this report, please do not hesitate to contact the undersigned.

Sincerely,

Calscience Environmental
Laboratories, Inc.
Stephen Nowak
Project Manager



Analytical Report



Blasland, Bouck & Lee, Inc.
2600 Michelson Drive, Suite 830
Irvine, CA 92612-6520

Date Received: 10/26/06
Work Order No: 06-10-1520
Preparation: N/A
Method: EPA TO-15
Units: ppb (v/v)

Project: NGSC Former Y-12 Facility / 37134

Page 1 of 4

Client Sample Number	Lab Sample Number	Date Collected	Matrix	Date Prepared	Date Analyzed	QC Batch ID
Inlet-102606-A	06-10-1520-1	10/26/06	Air	N/A	10/26/06	061026L01

Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Acetone	ND	3300	1650		t-1,2-Dichloroethene	ND	830	1650	
Benzene	ND	830	1650		t-1,3-Dichloropropene	ND	1700	1650	
Benzyl Chloride	ND	1700	1650		Ethylbenzene	ND	830	1650	
Bromodichloromethane	ND	830	1650		4-Ethyltoluene	ND	830	1650	
Bromoform	ND	830	1650		Hexachloro-1,3-Butadiene	ND	1700	1650	
Bromomethane	ND	830	1650		2-Hexanone	ND	1700	1650	
2-Butanone	ND	1700	1650		Methyl-t-Butyl Ether (MTBE)	ND	3300	1650	
Carbon Disulfide	ND	830	1650		Methylene Chloride	62000	17000	1650	
Carbon Tetrachloride	ND	830	1650		4-Methyl-2-Pentanone	ND	1700	1650	
Chlorobenzene	ND	830	1650		o-Xylene	ND	830	1650	
Chloroethane	ND	830	1650		p/m-Xylene	ND	1700	1650	
Chloroform	ND	830	1650		Styrene	ND	1700	1650	
Chloromethane	ND	830	1650		Tetrachloroethene	140000	33000	66000	
Dibromochloromethane	ND	830	1650		Toluene	3000	830	1650	
Dichlorodifluoromethane	ND	830	1650		Trichloroethene	550000	33000	66000	
1,1-Dichloroethane	1600	830	1650		Trichlorofluoromethane	ND	1700	1650	
1,1-Dichloroethene	540000	33000	66000		1,1,2-Trichloro-1,2,2-Trifluoroethane	ND	1700	1650	
1,2-Dibromoethane	ND	830	1650		1,1,1-Trichloroethane	19000	830	1650	
Dichlorotetrafluoroethane	ND	3300	1650		1,1,2-Trichloroethane	ND	830	1650	
1,2-Dichlorobenzene	ND	830	1650		1,3,5-Trimethylbenzene	ND	830	1650	
1,2-Dichloroethane	ND	830	1650		1,1,2,2-Tetrachloroethane	ND	1700	1650	
1,2-Dichloropropane	ND	830	1650		1,2,4-Trimethylbenzene	ND	1700	1650	
1,3-Dichlorobenzene	ND	830	1650		1,2,4-Trichlorobenzene	ND	1700	1650	
1,4-Dichlorobenzene	ND	830	1650		Vinyl Acetate	ND	1700	1650	
c-1,3-Dichloropropene	ND	830	1650		Vinyl Chloride	ND	830	1650	
c-1,2-Dichloroethene	ND	830	1650						
<u>Surrogates:</u>	<u>REC (%)</u>	<u>Control Limits</u>		<u>Qual</u>	<u>Surrogates:</u>	<u>REC (%)</u>	<u>Control Limits</u>		<u>Qual</u>
1,4-Bromofluorobenzene	101	57-129			1,2-Dichloroethane-d4	105	47-137		
Toluene-d8	97	78-156							

RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

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OCVOCRWQCB004221

Analytical Report



Blasland, Bouck & Lee, Inc.
 2600 Michelson Drive, Suite 830
 Irvine, CA 92612-6520

Date Received: 10/26/06
 Work Order No: 06-10-1520
 Preparation: N/A
 Method: EPA TO-15
 Units: ppb (v/v)

Project: NGSC Former Y-12 Facility / 37134

Page 2 of 4

Client Sample Number	Lab Sample Number	Date Collected	Matrix	Date Prepared	Date Analyzed	QC Batch ID
Inlet-102606-B	06-10-1520-2	10/26/06	Air	N/A	10/26/06	061026L01

Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Acetone	3700	3600	1800		t-1,2-Dichloroethene	ND	900	1800	
Benzene	ND	900	1800		t-1,3-Dichloropropene	ND	1800	1800	
Benzyl Chloride	ND	1800	1800		Ethylbenzene	ND	900	1800	
Bromodichloromethane	ND	900	1800		4-Ethyltoluene	ND	900	1800	
Bromoform	ND	900	1800		Hexachloro-1,3-Butadiene	ND	1800	1800	
Bromomethane	ND	900	1800		2-Hexanone	ND	1800	1800	
2-Butanone	ND	1800	1800		Methyl-t-Butyl Ether (MTBE)	ND	3600	1800	
Carbon Disulfide	ND	900	1800		Methylene Chloride	83000	18000	1800	
Carbon Tetrachloride	ND	900	1800		4-Methyl-2-Pentanone	ND	1800	1800	
Chlorobenzene	ND	900	1800		o-Xylene	ND	900	1800	
Chloroethane	ND	900	1800		p/m-Xylene	ND	1800	1800	
Chloroform	ND	900	1800		Styrene	2100	1800	1800	
Chloromethane	ND	900	1800		Tetrachloroethene	210000	36000	72000	
Dibromochloromethane	ND	900	1800		Toluene	4300	900	1800	
Dichlorodifluoromethane	ND	900	1800		Trichloroethene	680000	36000	72000	
1,1-Dichloroethane	1800	900	1800		Trichlorofluoromethane	ND	1800	1800	
1,1-Dichloroethene	600000	36000	72000		1,1,2-Trichloro-1,2,2-Trifluoroethane	ND	1800	1800	
1,2-Dibromoethane	ND	900	1800		1,1,1-Trichloroethane	23000	900	1800	
Dichlorotetrafluoroethane	ND	3600	1800		1,1,2-Trichloroethane	ND	900	1800	
1,2-Dichlorobenzene	ND	900	1800		1,3,5-Trimethylbenzene	ND	900	1800	
1,2-Dichloroethane	ND	900	1800		1,1,2,2-Tetrachloroethane	ND	1800	1800	
1,2-Dichloropropane	ND	900	1800		1,2,4-Trimethylbenzene	ND	1800	1800	
1,3-Dichlorobenzene	ND	900	1800		1,2,4-Trichlorobenzene	ND	1800	1800	
1,4-Dichlorobenzene	ND	900	1800		Vinyl Acetate	ND	1800	1800	
c-1,3-Dichloropropene	ND	900	1800		Vinyl Chloride	ND	900	1800	
c-1,2-Dichloroethene	ND	900	1800						
<u>Surrogates:</u>	<u>REC (%)</u>	<u>Control Limits</u>		<u>Qual</u>	<u>Surrogates:</u>	<u>REC (%)</u>	<u>Control Limits</u>		<u>Qual</u>
1,4-Bromofluorobenzene	105	57-129			1,2-Dichloroethane-d4	108	47-137		
Toluene-d8	96	78-156							

RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

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OCVOCRWQCB004222

Analytical Report



Blasland, Bouck & Lee, Inc.
 2600 Michelson Drive, Suite 830
 Irvine, CA 92612-6520

Date Received: 10/26/06
 Work Order No: 06-10-1520
 Preparation: N/A
 Method: EPA TO-15
 Units: ppb (v/v)

Project: NGSC Former Y-12 Facility / 37134

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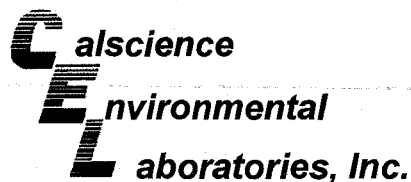
Client Sample Number	Lab Sample Number	Date Collected	Matrix	Date Prepared	Date Analyzed	QC Batch ID
Inlet-102606-C	06-10-1520-3	10/26/06	Air	N/A	10/27/06	061026L01

Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Acetone	ND	3600	1800		t-1,2-Dichloroethene	ND	900	1800	
Benzene	ND	900	1800		t-1,3-Dichloropropene	ND	1800	1800	
Benzyl Chloride	ND	1800	1800		Ethylbenzene	ND	900	1800	
Bromodichloromethane	3100	900	1800		4-Ethyltoluene	ND	900	1800	
Bromoform	ND	900	1800		Hexachloro-1,3-Butadiene	ND	1800	1800	
Bromomethane	ND	900	1800		2-Hexanone	ND	1800	1800	
2-Butanone	ND	1800	1800		Methyl-t-Butyl Ether (MTBE)	ND	3600	1800	
Carbon Disulfide	ND	900	1800		Methylene Chloride	50000	18000	1800	
Carbon Tetrachloride	ND	900	1800		4-Methyl-2-Pentanone	ND	1800	1800	
Chlorobenzene	ND	900	1800		o-Xylene	ND	900	1800	
Chloroethane	ND	900	1800		p/m-Xylene	2100	1800	1800	
Chloroform	ND	900	1800		Styrene	3100	1800	1800	
Chloromethane	ND	900	1800		Tetrachloroethene	180000	36000	72000	
Dibromochloromethane	ND	900	1800		Toluene	5600	900	1800	
Dichlorodifluoromethane	ND	900	1800		Trichloroethene	600000	36000	72000	
1,1-Dichloroethane	1200	900	1800		Trichlorofluoromethane	ND	1800	1800	
1,1-Dichloroethene	580000	36000	72000		1,1,2-Trichloro-1,2,2-Trifluoroethane	ND	1800	1800	
1,2-Dibromoethane	ND	900	1800		1,1,1-Trichloroethane	16000	900	1800	
Dichlorotetrafluoroethane	ND	3600	1800		1,1,2-Trichloroethane	ND	900	1800	
1,2-Dichlorobenzene	ND	900	1800		1,3,5-Trimethylbenzene	ND	900	1800	
1,2-Dichloroethane	ND	900	1800		1,1,2,2-Tetrachloroethane	ND	1800	1800	
1,2-Dichloropropane	ND	900	1800		1,2,4-Trimethylbenzene	ND	1800	1800	
1,3-Dichlorobenzene	ND	900	1800		1,2,4-Trichlorobenzene	ND	1800	1800	
1,4-Dichlorobenzene	ND	900	1800		Vinyl Acetate	ND	1800	1800	
c-1,3-Dichloropropene	ND	900	1800		Vinyl Chloride	ND	900	1800	
c-1,2-Dichloroethene	ND	900	1800						
<u>Surrogates:</u>	<u>REC (%)</u>	<u>Control Limits</u>	<u>Qual</u>		<u>Surrogates:</u>	<u>REC (%)</u>	<u>Control Limits</u>	<u>Qual</u>	
1,4-Bromofluorobenzene	110	57-129			1,2-Dichloroethane-d4	76	47-137		
Toluene-d8	97	78-156							

RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

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OCVOCRWQCB004223



Analytical Report



Blasland, Bouck & Lee, Inc.
2600 Michelson Drive, Suite 830
Irvine, CA 92612-6520

Date Received: 10/26/06
Work Order No: 06-10-1520
Preparation: N/A
Method: EPA TO-15
Units: ppb (v/v)

Project: NGSC Former Y-12 Facility / 37134

Page 4 of 4

Client Sample Number	Lab Sample Number	Date Collected	Matrix	Date Prepared	Date Analyzed	QC Batch ID
Method Blank	095-01-021-4,291	N/A	Air	N/A	10/26/06	061026L01

Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Acetone	ND	2.0	1		t-1,2-Dichloroethene	ND	0.50	1	
Benzene	ND	0.50	1		t-1,3-Dichloropropene	ND	1.0	1	
Benzyl Chloride	ND	1.0	1		Ethylbenzene	ND	0.50	1	
Bromodichloromethane	ND	0.50	1		4-Ethyltoluene	ND	0.50	1	
Bromoform	ND	0.50	1		Hexachloro-1,3-Butadiene	ND	1.0	1	
Bromomethane	ND	0.50	1		2-Hexanone	ND	1.0	1	
2-Butanone	ND	1.0	1		Methyl-t-Butyl Ether (MTBE)	ND	2.0	1	
Carbon Disulfide	ND	0.50	1		Methylene Chloride	ND	10	1	
Carbon Tetrachloride	ND	0.50	1		4-Methyl-2-Pentanone	ND	1.0	1	
Chlorobenzene	ND	0.50	1		o-Xylene	ND	0.50	1	
Chloroethane	ND	0.50	1		p/m-Xylene	ND	1.0	1	
Chloroform	ND	0.50	1		Styrene	ND	1.0	1	
Chloromethane	ND	0.50	1		Tetrachloroethene	ND	0.50	1	
Dibromochloromethane	ND	0.50	1		Toluene	ND	0.50	1	
Dichlorodifluoromethane	ND	0.50	1		Trichloroethene	ND	0.50	1	
1,1-Dichloroethane	ND	0.50	1		Trichlorofluoromethane	ND	1.0	1	
1,1-Dichloroethene	ND	0.50	1		1,1,2-Trichloro-1,2,2-Trifluoroethane	ND	1.0	1	
1,2-Dibromoethane	ND	0.50	1		1,1,1-Trichloroethane	ND	0.50	1	
Dichlorotetrafluoroethane	ND	2.0	1		1,1,2-Trichloroethane	ND	0.50	1	
1,2-Dichlorobenzene	ND	0.50	1		1,3,5-Trimethylbenzene	ND	0.50	1	
1,2-Dichloroethane	ND	0.50	1		1,1,2,2-Tetrachloroethane	ND	1.0	1	
1,2-Dichloropropane	ND	0.50	1		1,2,4-Trimethylbenzene	ND	1.0	1	
1,3-Dichlorobenzene	ND	0.50	1		1,2,4-Trichlorobenzene	ND	1.0	1	
1,4-Dichlorobenzene	ND	0.50	1		Vinyl Acetate	ND	1.0	1	
c-1,3-Dichloropropene	ND	0.50	1		Vinyl Chloride	ND	0.50	1	
c-1,2-Dichloroethene	ND	0.50	1						
Surrogates:	REC (%)	Control Limits		Qual	Surrogates:	REC (%)	Control Limits		Qual
1,4-Bromofluorobenzene	102	57-129			1,2-Dichloroethane-d4	102	47-137		
Toluene-d8	94	78-156							

RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

7440 Lincoln Way, Garden Grove, CA 92841-1427 • TEL: (714) 895-5494 • FAX: (714) 894-7501

OCVOCRWQCB004224

Analytical Report



Blasland, Bouck & Lee, Inc.
 2600 Michelson Drive, Suite 830
 Irvine, CA 92612-6520

Date Received: 10/26/06
 Work Order No: 06-10-1520
 Preparation: EPA 5030B
 Method: EPA 8260B
 Units: ug/L

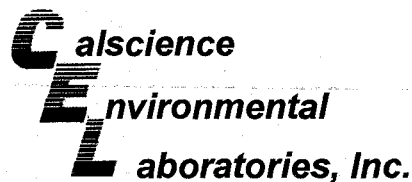
Project: NGSC Former Y-12 Facility / 37134

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Client Sample Number	Lab Sample Number	Date Collected	Matrix	Date Prepared	Date Analyzed	QC Batch ID
COMP-102606	06-10-1520-4	10/26/06	Aqueous	10/28/06	10/28/06	061028L01

Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Acetone	ND	50	1		1,3-Dichloropropane	ND	1.0	1	
Benzene	ND	0.50	1		2,2-Dichloropropane	ND	1.0	1	
Bromobenzene	ND	1.0	1		1,1-Dichloropropene	ND	1.0	1	
Bromochloromethane	ND	1.0	1		c-1,3-Dichloropropene	ND	0.50	1	
Bromodichloromethane	ND	1.0	1		t-1,3-Dichloropropene	ND	0.50	1	
Bromoform	ND	1.0	1		Ethylbenzene	ND	1.0	1	
Bromomethane	ND	10	1		2-Hexanone	ND	10	1	
2-Butanone	ND	10	1		Isopropylbenzene	ND	1.0	1	
n-Butylbenzene	ND	1.0	1		p-Isopropyltoluene	ND	1.0	1	
sec-Butylbenzene	ND	1.0	1		Methylene Chloride	ND	10	1	
tert-Butylbenzene	ND	1.0	1		4-Methyl-2-Pentanone	ND	10	1	
Carbon Disulfide	ND	10	1		Naphthalene	ND	10	1	
Carbon Tetrachloride	ND	0.50	1		n-Propylbenzene	ND	1.0	1	
Chlorobenzene	ND	1.0	1		Styrene	ND	1.0	1	
Chloroethane	ND	1.0	1		1,1,1,2-Tetrachloroethane	ND	1.0	1	
Chloroform	ND	1.0	1		1,1,2,2-Tetrachloroethane	ND	1.0	1	
Chloromethane	ND	10	1		Tetrachloroethene	18	1	1	
2-Chlorotoluene	ND	1.0	1		Toluene	ND	1.0	1	
4-Chlorotoluene	ND	1.0	1		1,2,3-Trichlorobenzene	ND	1.0	1	
Dibromochloromethane	ND	1.0	1		1,2,4-Trichlorobenzene	ND	1.0	1	
1,2-Dibromo-3-Chloropropane	ND	5.0	1		1,1,1-Trichloroethane	3.5	1.0	1	
1,2-Dibromoethane	ND	1.0	1		1,1,2-Trichloro-1,2,2-Trifluoroethane	ND	10	1	
Dibromomethane	ND	1.0	1		1,1,2-Trichloroethane	2.5	1.0	1	
1,2-Dichlorobenzene	ND	1.0	1		Trichloroethene	140	1	1	
1,3-Dichlorobenzene	ND	1.0	1		Trichlorofluoromethane	ND	10	1	
1,4-Dichlorobenzene	ND	1.0	1		1,2,3-Trichloropropane	ND	5.0	1	
Dichlorodifluoromethane	ND	1.0	1		1,2,4-Trimethylbenzene	ND	1.0	1	
1,1-Dichloroethane	ND	1.0	1		1,3,5-Trimethylbenzene	ND	1.0	1	
1,2-Dichloroethane	0.81	0.50	1		Vinyl Acetate	ND	10	1	
1,1-Dichloroethene	32	1	1		Vinyl Chloride	ND	0.50	1	
c-1,2-Dichloroethene	ND	1.0	1		p/m-Xylene	ND	1.0	1	
t-1,2-Dichloroethene	ND	1.0	1		o-Xylene	ND	1.0	1	
1,2-Dichloropropane	ND	1.0	1		Methyl-t-Butyl Ether (MTBE)	ND	1.0	1	
<u>Surrogates:</u>	<u>REC (%)</u>	<u>Control Limits</u>		<u>Qual</u>	<u>Surrogates:</u>	<u>REC (%)</u>	<u>Control Limits</u>		<u>Qual</u>
Dibromofluoromethane	105	74-140			1,2-Dichloroethane-d4	111	74-146		
Toluene-d8	99	88-112			1,4-Bromofluorobenzene	97	74-110		

RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers



Analytical Report



Blasland, Bouck & Lee, Inc.
2600 Michelson Drive, Suite 830
Irvine, CA 92612-6520

Date Received: 10/26/06
Work Order No: 06-10-1520
Preparation: EPA 5030B
Method: EPA 8260B
Units: ug/L

Project: NGSC Former Y-12 Facility / 37134

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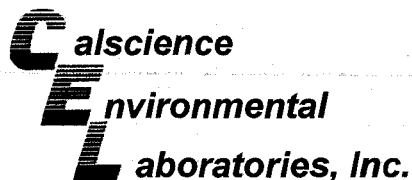
Client Sample Number	Lab Sample Number	Date Collected	Matrix	Date Prepared	Date Analyzed	QC Batch ID
Method Blank	099-10-006-19,455	N/A	Aqueous	10/28/06	10/28/06	061028L01

Parameter	Result	RL	DF	Qual	Parameter	Result	RL	DF	Qual
Acetone	ND	50	1		1,3-Dichloropropane	ND	1.0	1	
Benzene	ND	0.50	1		2,2-Dichloropropane	ND	1.0	1	
Bromobenzene	ND	1.0	1		1,1-Dichloropropene	ND	1.0	1	
Bromochloromethane	ND	1.0	1		c-1,3-Dichloropropene	ND	0.50	1	
Bromodichloromethane	ND	1.0	1		t-1,3-Dichloropropene	ND	0.50	1	
Bromoform	ND	1.0	1		Ethylbenzene	ND	1.0	1	
Bromomethane	ND	10	1		2-Hexanone	ND	10	1	
2-Butanone	ND	10	1		Isopropylbenzene	ND	1.0	1	
n-Butylbenzene	ND	1.0	1		p-Isopropyltoluene	ND	1.0	1	
sec-Butylbenzene	ND	1.0	1		Methylene Chloride	ND	10	1	
tert-Butylbenzene	ND	1.0	1		4-Methyl-2-Pentanone	ND	10	1	
Carbon Disulfide	ND	10	1		Naphthalene	ND	10	1	
Carbon Tetrachloride	ND	0.50	1		n-Propylbenzene	ND	1.0	1	
Chlorobenzene	ND	1.0	1		Styrene	ND	1.0	1	
Chloroethane	ND	1.0	1		1,1,1,2-Tetrachloroethane	ND	1.0	1	
Chloroform	ND	1.0	1		1,1,2,2-Tetrachloroethane	ND	1.0	1	
Chloromethane	ND	10	1		Tetrachloroethene	ND	1.0	1	
2-Chlorotoluene	ND	1.0	1		Toluene	ND	1.0	1	
4-Chlorotoluene	ND	1.0	1		1,2,3-Trichlorobenzene	ND	1.0	1	
Dibromochloromethane	ND	1.0	1		1,2,4-Trichlorobenzene	ND	1.0	1	
1,2-Dibromo-3-Chloropropane	ND	5.0	1		1,1,1-Trichloroethane	ND	1.0	1	
1,2-Dibromoethane	ND	1.0	1		1,1,2-Trichloro-1,2,2-Trifluoroethane	ND	10	1	
Dibromomethane	ND	1.0	1		1,1,2-Trichloroethane	ND	1.0	1	
1,2-Dichlorobenzene	ND	1.0	1		Trichloroethene	ND	1.0	1	
1,3-Dichlorobenzene	ND	1.0	1		Trichlorofluoromethane	ND	10	1	
1,4-Dichlorobenzene	ND	1.0	1		1,2,3-Trichloropropane	ND	5.0	1	
Dichlorodifluoromethane	ND	1.0	1		1,2,4-Trimethylbenzene	ND	1.0	1	
1,1-Dichloroethane	ND	1.0	1		1,3,5-Trimethylbenzene	ND	1.0	1	
1,2-Dichloroethane	ND	0.50	1		Vinyl Acetate	ND	10	1	
1,1-Dichloroethene	ND	1.0	1		Vinyl Chloride	ND	0.50	1	
c-1,2-Dichloroethene	ND	1.0	1		p/m-Xylene	ND	1.0	1	
t-1,2-Dichloroethene	ND	1.0	1		o-Xylene	ND	1.0	1	
1,2-Dichloropropane	ND	1.0	1		Methyl-t-Butyl Ether (MTBE)	ND	1.0	1	
Surrogates:	REC (%)	Control Limits	Qual		Surrogates:	REC (%)	Control Limits	Qual	
Dibromofluoromethane	103	74-140			1,2-Dichloroethane-d4	105	74-146		
Toluene-d8	99	88-112			1,4-Bromofluorobenzene	97	74-110		

RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

7440 Lincoln Way, Garden Grove, CA 92841-1427 • TEL:(714) 895-5494 • FAX: (714) 894-7501

OCVOCRWQCB004226



Quality Control - Spike/Spike Duplicate



Blasland, Bouck & Lee, Inc.
2600 Michelson Drive, Suite 830
Irvine, CA 92612-6520

Date Received: 10/26/06
Work Order No: 06-10-1520
Preparation: EPA 5030B
Method: EPA 8260B

Project NGSC Former Y-12 Facility / 37134

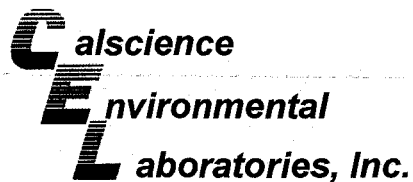
Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	MS/MSD Batch Number
06-10-1557-3	Aqueous	GC/MS R	10/28/06	10/28/06	061028S01

Parameter	MS %REC	MSD %REC	%REC CL	RPD	RPD CL	Qualifiers
Benzene	103	104	88-118	1	0-7	
Carbon Tetrachloride	104	107	67-145	2	0-11	
Chlorobenzene	110	112	88-118	2	0-7	
1,2-Dichlorobenzene	110	112	86-116	2	0-8	
1,1-Dichloroethene	107	108	70-130	1	0-25	
Toluene	108	109	87-123	1	0-8	
Trichloroethene	107	107	79-127	1	0-10	
Vinyl Chloride	90	93	69-129	3	0-13	
Methyl-t-Butyl Ether (MTBE)	103	104	71-131	1	0-13	
Tert-Butyl Alcohol (TBA)	111	98	36-168	13	0-45	
Diisopropyl Ether (DIPE)	108	110	81-123	2	0-9	
Ethyl-t-Butyl Ether (ETBE)	106	108	72-126	1	0-12	
Tert-Amyl-Methyl Ether (TAME)	107	107	72-126	1	0-12	
Ethanol	109	100	53-149	8	0-31	

RPD - Relative Percent Difference, CL - Control Limit

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OCVOCRWQCB004227



Quality Control - LCS/LCS Duplicate



Blasland, Bouck & Lee, Inc.
2600 Michelson Drive, Suite 830
Irvine, CA 92612-6520

Date Received: N/A
Work Order No: 06-10-1520
Preparation: N/A
Method: EPA TO-15

Project: NGSC Former Y-12 Facility / 37134

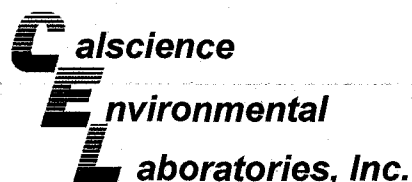
Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number
095-01-021-4,291	Air	GC/MS DD	N/A	10/26/06	061026L01

Parameter	LCS %REC	LCSD %REC	%REC CL	RPD	RPD CL	Qualifiers
Benzene	109	111	60-156	2	0-40	
Carbon Tetrachloride	108	111	64-154	3	0-32	
1,2-Dibromoethane	98	99	54-144	1	0-36	
1,2-Dichlorobenzene	100	101	34-160	1	0-47	
1,2-Dichloroethane	85	104	69-153	20	0-30	
1,2-Dichloropropane	100	101	67-157	0	0-35	
1,4-Dichlorobenzene	96	95	36-156	1	0-47	
c-1,3-Dichloropropene	107	109	61-157	2	0-35	
Ethylbenzene	112	113	52-154	1	0-38	
o-Xylene	109	111	52-148	2	0-38	
p/m-Xylene	101	102	42-156	1	0-41	
Tetrachloroethene	106	105	56-152	0	0-40	
Toluene	104	106	56-146	1	0-43	
Trichloroethene	118	119	63-159	0	0-34	
1,1,2-Trichloroethane	99	98	65-149	0	0-37	
Vinyl Chloride	83	113	45-177	30	0-36	

RPD - Relative Percent Difference, CL - Control Limit

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OCVOCRWQCB004228



Quality Control - LCS/LCS Duplicate



Blasland, Bouck & Lee, Inc.
2600 Michelson Drive, Suite 830
Irvine, CA 92612-6520

Date Received: N/A
Work Order No: 06-10-1520
Preparation: EPA 5030B
Method: EPA 8260B

Project: NGSC Former Y-12 Facility / 37134

Quality Control Sample ID	Matrix	Instrument	Date Prepared	Date Analyzed	LCS/LCSD Batch Number
099-10-006-19,455	Aqueous	GC/MS R	10/28/06	10/28/06	061028L01

Parameter	LCS %REC	LCSD %REC	%REC CL	RPD	RPD CL	Qualifiers
Benzene	101	103	84-120	2	0-8	
Carbon Tetrachloride	105	107	63-147	1	0-10	
Chlorobenzene	108	110	89-119	2	0-7	
1,2-Dichlorobenzene	111	111	89-119	0	0-9	
1,1-Dichloroethene	106	107	77-125	1	0-16	
Toluene	106	108	83-125	2	0-9	
Trichloroethene	105	107	89-119	2	0-8	
Vinyl Chloride	94	92	63-135	2	0-13	
Methyl-t-Butyl Ether (MTBE)	102	104	82-118	2	0-13	
Tert-Butyl Alcohol (TBA)	85	93	46-154	9	0-32	
Diisopropyl Ether (DIPE)	108	108	81-123	0	0-11	
Ethyl-t-Butyl Ether (ETBE)	105	108	74-122	2	0-12	
Tert-Amyl-Methyl Ether (TAME)	103	106	76-124	3	0-10	
Ethanol	97	113	60-138	15	0-32	

RPD - Relative Percent Difference, CL - Control Limit

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OCVOCRWQCB004229

Glossary of Terms and Qualifiers

Work Order Number: 06-10-1520

<u>Qualifier</u>	<u>Definition</u>
*	See applicable analysis comment.
1	Surrogate compound recovery was out of control due to a required sample dilution, therefore, the sample data was reported without further clarification.
2	Surrogate compound recovery was out of control due to matrix interference. The associated method blank surrogate spike compound was in control and, therefore, the sample data was reported without further clarification.
3	Recovery of the Matrix Spike or Matrix Spike Duplicate compound was out of control due to matrix interference. The associated LCS and/or LCSD was in control and, therefore, the sample data was reported without further clarification.
4	The MS/MSD RPD was out of control due to matrix interference. The LCS/LCSD RPD was in control and, therefore, the sample data was reported without further clarification.
5	The PDS/PDSD associated with this batch of samples was out of control due to a matrix interference effect. The associated batch LCS/LCSD was in control and, hence, the associated sample data was reported with no further corrective action required.
A	Result is the average of all dilutions, as defined by the method.
B	Analyte was present in the associated method blank.
C	Analyte presence was not confirmed on primary column.
E	Concentration exceeds the calibration range.
H	Sample received and/or analyzed past the recommended holding time.
J	Analyte was detected at a concentration below the reporting limit and above the laboratory method detection limit. Reported value is estimated.
N	Nontarget Analyte.
ND	Parameter not detected at the indicated reporting limit.
Q	Spike recovery and RPD control limits do not apply resulting from the parameter concentration in the sample exceeding the spike concentration by a factor of four or greater.
U	Undetected at the laboratory method detection limit.
X	% Recovery and/or RPD out-of-range.
Z	Analyte presence was not confirmed by second column or GC/MS analysis.

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GARDEN GROVE, CA 92841-1427
TEL: (714) 895-5494 • FAX: (714) 894-7501

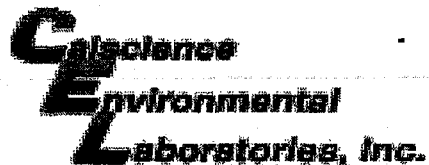
Date 10.26.06

Page 1 of 1

DISTRIBUTION: When with final report, Green to file, Yellow to Client.
Please note that pages 1 and 2 of 2 of our T/Cs are printed on the reverse side of the Green and Yellow copies respectively.

02/20/06 Revision

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Q&Q Graphic 714-898-9702



WORK ORDER #: 06 - 10 - 1520

Cooler 1 of 1

SAMPLE RECEIPT FORM

CLIENT: BBLDATE: 10/26/6

TEMPERATURE - SAMPLES RECEIVED BY:

CALSCIENCE COURIER:

- ☐ Chilled, cooler with temperature blank provided.
☐ Chilled, cooler without temperature blank.
☒ Chilled and placed in cooler with wet ice.
☐ Ambient and placed in cooler with wet ice.
☒ Ambient temperature.

LABORATORY (Other than Calscience Courier):

- ☐ °C Temperature blank.
☐ °C IR thermometer.
☐ Ambient temperature.

3.7 °C Temperature blank.Initial: 

CUSTODY SEAL INTACT:

Sample(s): _____ Cooler: _____ No (Not Intact): _____

Not Present: ☒Initial: 

SAMPLE CONDITION:

	Yes	No	N/A
Chain-Of-Custody document(s) received with samples.....	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sampler's name indicated on COC.....	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sample container label(s) consistent with custody papers.....	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sample container(s) intact and good condition.....	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Correct containers and volume for analyses requested.....	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Proper preservation noted on sample label(s).....	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
VOA vial(s) free of headspace.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tedlar bag(s) free of condensation.....	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Initial: 

COMMENTS:

